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TREATMENT OF THE OVERFLOW INCONTINENCE OF NEUROGENIC VESICAL DYSFUNCTION*

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IF one considers the lesions of the nervous system which disturb bladder function, he must be struck at once by the fact that one feature is common to nearly all of them, that is, impairment or destruction of sensation. This predominance of sensory lesions of the bladder is obviously due chiefly to the rarity of diseases which affect only motor centers and tracts, but also to the fact that pure motor disturbances of the nervous system rarely affect the function of the bladder.

The Innervation of the Bladder[2]

It is generally conceded that at least one, and possibly two, centers for micturition[3] exist in the brain, probably in the frontal lobe, and that the motor fibers to the bladder lie in or about the pyramidal tracts, while the sensory fibers course chiefly in the posterior columns. It remains to be determined accurately whether there are any true urinary centers in the lumbar or sacral segments of the spinal cord. This question has not been settled because of the presence, in the wall of the bladder itself, of a center for emptying the viscus. This center may involve the ganglia of the vesical plexus (Fig. 1) or it may be simply a question of that inherent irritability of unstriated muscle which leads it to contract when sufficiently stretched.

It is generally agreed that motor fibers reach the detrusor and most of its sensory fibers leave it via the pelvic nerve (n. erigens), the components of which enter and leave the spinal cord by the upper two or three sacral segments. The rôle of this nerve in controlling the internal sphincter is not settled, although it is usually held that its stimulation relaxes the sphincter. It seems more probable that closure is maintained by its normal tone, and that it is pulled open by the trigonal muscle. The sensory portion carries common sensation (sense of fullness, desire to void).

The hypogastric nerve (presacral nerve or plexus) is said to produce relaxation of the detrusor and contraction of the internal sphincter when stimulated, although this view has recently been questioned.[4] It contains sensory fibers which carry the sensation of overdistention of the bladder (strangury). Its components enter and leave the upper lumbar and lower thoracic segments of the cord.

The pudic nerve is unoubtedly motor to the external sphincter (voluntary retention of urine) and sensory to the urethra, and connects with the upper sacral segments.

The Nervous Control of Micturition

The nervous mechanism of urination is not wholly settled. It is certain that contraction of the detrusor is initiated by a rise in the intravesical pressure, which itself stimulates the detrusor to more powerful contraction. Whether this can be brought about by the direct influence of a cerebral center upon an unstriated muscle such as the detrusor is doubtful. Most probably it is usually effected by the simple accumulation of urine, leakage being prevented in the interim by the normal tone of the sphincters. Accumulation of urine having raised the intravesical tension, contractions of the detrusor and trigone ensue while the desire to void is transmitted to the cerebral cortical center, which in turn relaxes

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the external sphincter willfully. The trigonal muscle having pulled open the internal sphincter (Fig. 2) urine escapes.*

The hypogastric nerves may come into play when it is desired to inhibit detrusor contraction, but it may also be that, a prolonged contraction having met with the barrier of a voluntarily contracted external sphincter, the detrusor becomes fatigued and relaxes without the intervention of the nervous system. When one wishes to urinate without the intravesical pressure being high enough to initiate a contraction, the mechanism is the same except that the original rise in tension is brought about by contraction of the abdominal muscles.

Thus two facts complicate all theories of the nervous mechanism of micturition, namely, the probable existence of local muscular mechanisms for contracting and relaxing the detrusor without the intervention of the nervous system at all, and the uncertainty which prevails as to the exact rôle of the brain in urination. The nervous control of urination probably consists merely in superimposing upon the local mechanism a means of voluntary control of the external sphincter, and a means of increasing the intravesical tension voluntarily if indirectly by tightening the abdominal muscles.

It seems probable from this that disturbances of the sensory supply of the bladder should be more important than lesions of the motor pathways. However, in nearly every instance, the lesions in the nervous system itself are mixed in character because of the close proximity of motor and sensory tracts and pathways.

The Effect of Sensory Lesions

Abrupt complete loss of sensation leads to distention of the bladder and ultimately, through myogenic detrusor contractions (the external sphincter is relaxed by being cut off from the motor cortex, as is the anal sphincter during spinal anesthesia) overflow occurs. In the absence of the voluntary contraction of the abdominal wall which is required to maintain intravesical tension during normal micturition, the resultant bladder emptying is incomplete unless supplemented by manual pressure. This type of lesion is best exemplified by trauma to the spinal cord and constitutes a special case which is not to be discussed here.

I am primarily concerned with those lesions which produce a gradual and usually incomplete loss of sensation. Such a condition is but rarely seen in disease of the brain because the lesions must be bilaterally symmetrical in order to produce them, and because lesions extensive enough to do so usually cloud the sensorium and so confuse the picture. These same facts have made accurate cortical localization of the various functions of the bladder difficult and unsatisfactory.

In the spinal cord, tabes dorsalis is the commonest of the lesions which disturb the vesical function, but similar disturbances also occur with multiple and subacute combined sclerosis, syringomyelia, in spina bifida, and as a late complication of infectious and traumatic myelitis. Poliomyelitis, predominately motor in character, does not commonly alter the vesical function.

The commonest disorder due to lesions of the peripheral nerves is that seen with occult sacral spina bifida. The pressure of the presenting part upon the pelvic nerves and vesical plexus during labor may have similar, although acute, effects, and the operative trauma or postoperative inflammatory reaction following posterior resection of the rectum may also reduce or destroy bladder sensation temporarily or, rarely, permanently.

With slowly progressive impairment of vesical sensation, the patient becomes less conscious of micturition, and voids infrequently. As a consequence, the bladder is usually overfull and its tension slightly elevated, sufficiently to cause some capillary stasis, reduced oxygenation of the detrusor and, ultimately, atrophy. A stage is now reached in which the bladder is no longer emptied, distension is more marked, and atrophy progresses. If the condition is not interrupted by treatment, overflow incontinence now develops, simply because sensory impairment is so advanced that the patient is unaware of the myogenic contractions of his bladder and does not call his external sphincter into action. In other words the bladder, while remaining active, becomes "unconscious."

Treatment

At any stage in a neurogenic vesical dysfunction due to sensory loss, two types of treatment are available, namely, methods of improving the

*While Young and Wesson hold that trigonal contraction is dependent on hypogastric stimulation, it is equally possible that simple stretching or compression of the trigone during vesical distention may have a similar effect without the intervention of the nervous system.

expulsive force of the detrusor, and education to compensate for loss of sensation. Methods of improving or restoring the expulsive force include the use of drugs which stimulate the contraction of smooth muscle (eserine, pilocarpine, acetyl choline and especially its more stable derivatives); rest of the bladder by intermittent or continuous catheterization or by cystostomy; and the performance of presacral neurectomy.

Education consists in training the patient to micturate at regular intervals by the clock even in the absence of any conscious desire to do so; to assist micturition by assuming that position (often sitting) in which he himself finds it easiest to accomplish, and by massaging the bladder firmly and persistently during the act; and by refusing to allow him to urinate hastily. The importance of these measures can scarcely be overemphasized. Their employment absolutely requires an intelligent, coöperative patient.

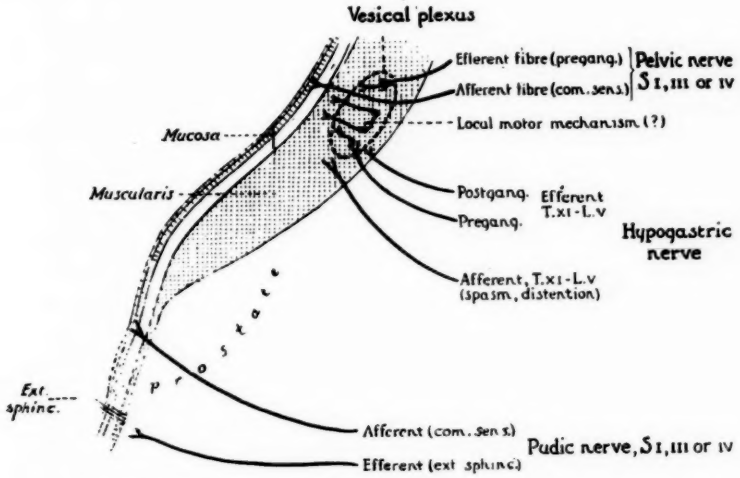

Fig. 1. Suggested local nervous mechanism for the expulsion of urine.

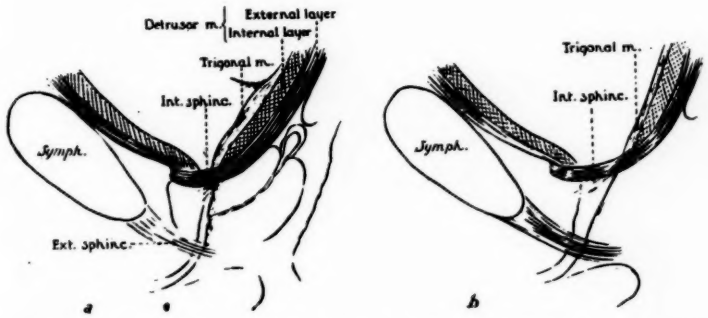

Fig. 2. The function of the vesical trigone (after Young and Wesson, Arch. Surg., 3:1-39, 1921).

The use of drugs and the catheter, coupled with training, may succeed in the early stages when retention alone is present, but when the stage of overflow is reached, more effective measures are usually required. An essential preliminary to therapy in these cases is to exclude the possibility of a complicating mechanical obstruction, remembering that a prostatic fibrosis or hypertrophy so slight in degree as to cause no symptoms below a normal bladder, may lead to retention or overflow if even mild neurogenic vesical dysfunction exists.

Case 1.—A. S., a man aged fifty-five, suffered a traumatic myelitis at the 12th thoracic segment with urinary retention and fecal incontinence. After a laminectomy in September, 1932, he made a good recovery except for an overflow incontinence of urine for which I first saw him in December, 1934. Cystoscopy having demonstrated an internal sphincter held open by prostatic fibrosis, as well as impairment of sensation and expulsive force, urethral dilatations with the Kollmann dilator were carried out at weekly intervals for eight weeks. In April, 1935, control was normal and the residual urine had disappeared.

Case 2.—G. C., a man aged fifty-eight, had had tabes dorsalis, bilateral Charcot ankle joints, and severe hypertension for years. Difficult urination had been noted for two years, and incontinence for one month. There were the usual signs of tabes dorsalis, a blood pressure of 205/120, a fibrous, contracted prostate, and 1,500 c.c. of cloudy residual urine. Sensation and expulsive force were much reduced, the internal sphincter was relaxed, and the bladder trabeculated. After two weeks of drainage with the inlying catheter and the administration of pilocarpine, the residual urine was unchanged. A transurethral resection was done, only 1.5 grams of tissue being removed. Thereafter the patient was taught to void every three hours during the day and twice at night. The residual urine never exceeded 100 and was usually 20 c.c. until his death from a cerebral hemorrhage six months later. Incontinence did not recur.

These are typical instances of the aggravation of neurogenic vesical dysfunction by mechanical obstruction so slight that it would not affect the function of a normal bladder at all.

In most instances, no obstructive lesion is present, and reliance has to be placed upon increasing expulsive force and education.

Case 3.—F. B., an Indian aged fifty-one, was seen in the Neurological Clinic in 1930 with typical tabes dorsalis, 150 c.c. of residual urine, and a mild overflow incontinence. He was given antiluetic therapy and bladder lavage by his home physician but grew slowly worse. In May, 1935, overflow was severe, there were 200 c.c. of infected residual urine, and cystoscopy showed a relaxed internal sphincter, much reduced sensation and expulsive force, trabeculation, and poor kidney function.

Cystostomy was done on May 11, 1935, and maintained until August 7, 1935, at which time the bladder capacity was 100 c.c., sensation fair, and expulsive force excellent. The cystostomy was allowed to close, he was given pilocarpine, and taught to void "by the clock." On August 15th, control was normal and the residual urine 20 c.c. The symptoms have not thus far recurred.

Case 4.—D. K., a boy of nine, had received energetic intraspinal therapy for meningococcic meningitis in June, 1934. He recovered except that he was incontinent of urine and feces, apparently due to trauma of the cauda equina. On admission in September, 1934, he had saddle anesthesia, 200 c.c. of residual urine, and the cystoscopic findings of a neurogenic dysfunction. He had been catheterized three times daily since the onset of the trouble.

In the hope of recovery of the spinal cord, cystostomy was done on October 15, 1934, after bladder rest with an inlying catheter, and the administration of pilocarpine and B methyl acetyl choline to the point of tolerance had yielded no benefit. The cystostomy was closed after three months and the patient was taught to void every two hours and to massage the bladder area during urination. The residual urine was at first 200 c.c., but fell to between 0 and 50 c.c. during the administration of pilocarpine, and has remained so after its discontinuance.

However, enough incontinence remains to require the wearing of a urinal. While I suspect that the severity of the lesion (fecal incontinence, saddle anesthesia) is such that perfect control cannot be anticipated, the reduction of the residual urine has been of undoubted value so far as the future of his kidneys is concerned. He is being watched with a view to the performance of a sphincter plastic if the spinal cord does not recover. The possibility of a prostatic fibrosis which holds the urethra open (secondary to prolonged catheterization) must be excluded first.

An infectious process in the spinal cord may produce disturbances in the function of the bladder similar to those under discussion.

Case 5.—G. P., aged twenty-one, was normal until 1928 when he was suddenly seized with paralysis of the legs, anesthesia below the umbilicus, and incontinence of urine and feces. Recovery was progressive until, on admission in December, 1933, he was able to walk almost normally but had persistent urinary incontinence with 250 c.c. of residual urine. Cystoscopy showed a typical neurogenic dysfunction, and catheterization relieved the incontinence until 250 c.c. of urine had again accumulated in the bladder. The lower extremities were somewhat spastic, and there was hypesthesia of the skin below the umbilicus.

Presacral neurectomy was done after the method of Braasch and Learmonth[4] on January 3, 1934, and was followed by complete retention. An indwelling catheter was used until, on the 25th day, the retention persisting, an acute epididymitis developed. Cystostomy was done, and maintained for six weeks. Upon closure of the suprapubic fistula, complete bladder emptying followed a single dose of Mecholine (Beta methyl acetyl choline) and, with "urination by the clock," has persisted to the present time. Incontinence has not recurred.

To my mind this case demonstrates that presacral neurectomy is to be regarded simply as one of the adjuvant measures for increasing the expulsive force and, while effective when damage to the bladder is mild, will fail if much atrophy of the detrusor has occurred.

Spina bifida, both occult and frank, is often associated with disturbed bladder function. The

mild forms are apparently due to an associated anomaly of the vesical plexus, since the only evidence of disorder is in the bladder. In the severe forms one finds perineal (saddle) anesthesia, sensory disturbances in the feet, and fecal incontinence, indicating that the spinal cord itself is the seat of an anomaly.

Case 6 illustrates the former situation.

Case 6.—G. K., aged fourteen, had always urinated frequently and had enuresis, but two years before admission had developed diurnal incontinence of urine. On admission on January 25, 1933, neurological examination was normal, but there was a palpable defect in the sacrum, the bladder was visibly distended, and urine escaped when light pressure was made upon it. The residual urine was 250 c.c. and cystoscopy disclosed a relaxed internal sphincter, poor sensation and expulsive force, and advanced trabeculation with cellule formation. Excretion urography demonstrated a moderate bilateral hydronephrosis. Use of an inlying catheter and drug therapy for six weeks having failed to produce benefit, a presacral neurectomy was done on March 16, 1933. Influenced by the damaged state of the bladder, I made a cystostomy at the same time. This was closed six weeks later, and "urination by the clock" instituted. The residual urine at discharge was 20 c.c.

In April, 1934, there was till a patch of granulation at the site of the cystostomy, incontinence occurred only if the patient forgot to micturate, and the residual urine was 15 c.c. Excision of the granulations was followed by healing. In September, 1935, the residual urine was 15 c.c. and there was no incontinence.

The effect of forgetting to urinate points clearly to the importance of urination at stated intervals in these cases, since no form of therapy can restore normal sensation. Neglect of this precaution will undoubtedly result in recurrence of the urinary disturbance.

The severe form of spina bifida is comparable in its effects to injury of the cauda equina as described in Case 4, and does not offer so good a prospect of cure by the measures here described.

Case 7.—H. S., a boy of eight, was operated upon at the age of eight days for a sacral spina bifida and meningocele. When first seen in September, 1934, he had never learned to urinate normally, and had always been partially incontinent of feces. Neurological examination disclosed hypesthesia of the perianal skin, the anal sphincters were lax, the residual urine was 100 c.c., and the usual cystoscopic findings were present. Combined presacral neurectomy and cystostomy were done on September 10, 1934. The cystostomy was closed six weeks later and, on November 18, the residual urine was 15 c.c. and incontinence of urine was absent.

In April, 1935, nocturnal incontinence had recurred, and examination disclosed a cicatricial posterior urethritis with the internal sphincter held open and no residual urine. Dilatations by the home physicion having been fruitless, the patient was readmitted to the hospital in October and is now being treated with an inlying catheter, pilocarpine, and dilatations. I fear that his sensation is so defective that normal control can never be restored.

Summary and Conclusions

1. Most cases of neurogenic vesical dysfunction are due to sensory lesions.

2. Early in their course partial retention develops, and can often be relieved by bladder rest with the inlying catheter supplemented by drugs to increase the expulsive force, provided that the patient is then trained to urinate at regular intervals by the clock.

3. Later, the bladder wall is damaged by the distention so that some degree of atrophy occurs, and overflow incontinence (unconscious partial evacuation of the urine) follows.

4. In selected cases, six to twelve weeks rest of the bladder by cystostomy, followed by careful training, may give relief. The habit of "urination by the clock" must be maintained permanently if recurrence is to be avoided.

5. With more severe damage to the detrusor, cystostomy is best supplemented by presacral neurectomy, which should be regarded only as one means of increasing expulsive force.

6. If the lesion of the nervous system is advanced enough to produce fecal incontinence, the prospect of cure by these methods is poor, because sensation is insufficient to permit continuous voluntary contraction of the internal sphincter.

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RADIATION THERAPY*

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THE earliest attempts at x-ray therapy were reported within three months after Roentgen's discovery of the x-rays. The first experimental work was done on the theory that these x-rays of Roentgen might have bactericidal powers. In a period between 1896 to 1902 a decided controversy was waged over the bactericidal powers of the rays.

In 1902 Pusey and Caldwell,[7] in their monograph "The Roentgen Rays in Therapeutics and Diagnosis," stated as follows: "The fact that organisms in living tissues can be destroyed by exposure to x-rays while the same organisms in inert cultures are uninfluenced by x-ray exposure proves positively that it is not the influence of the x-rays per se that causes the destruction, but that the tissues themselves, doubtless under the conditions of activity excited by x-rays, play the important role in the germicidal process."

The accuracy of this observation was shown clearly nearly twenty years later when Hickey, in Detroit, and Ledoux-Lebard, in Paris, simultaneously reported the cure of diphtheria carriers by x-ray treatment directed at the lymphoid tissue in the throat, which acted as the host for the bacilli.

The first record known of an attempt to treat cancer by x-rays comes from the records of E. H. Grubbe[4] of Chicago, who treated a patient on January 29, 1896, for cancer of the breast. Grubbe was at that time suffering from a Roentgen dermatitis of his hands contracted in his experimental work. This inflammatory reaction on his hands led him to experiment on cancer with the possibility of a therapeutic effect resulting from producing a like inflammation.

These early experiments were done with static machines. Following this period induction coils of gradually increasing capacity were evolved and higher voltages and more current became available.

At this stage the only method of estimating dosage was based on fluoroscopic or photographic effects of the rays. Thus, each worker would be forced to work out his own technic, and owing to the lack of measuring instruments could not transmit his method to other workers.

It was not until 1902 that Holtzknecht[5] invented his chromo-radiometer which was not unlike our present hemoglobinometer. Following this work of Holtzknecht, American physicists developed the spark gap for measuring voltage and the milliampere meter for measuring current. These measurements in America rapidly superseded the more inaccurate methods, although European workers continued for many years to use the earlier methods of measurement.

The foundation for deep x-ray therapy was laid by Nicholas Senn[9] of Chicago, when in 1903 he reported a favorable result in the treatment of leukemia. He reported that the size of the spleen was reduced and a reduction in the number of leukocytes took place.

Not until 1904 was any filter interposed between the patient and the x-ray tube.

Perthes[6] in Germany used aluminum. He noted that Roentgen in his original observation stated that "all substances have respectively a selective absorbing power for the rays."

Aluminum was known not to interfere with the passage of "useful" or harder rays; he theorized that by that same token it might absorb the non-penetrating or soft rays. He found that not only would the skin tolerate larger dosages, but that the therapeutic effect in the deeper structures became more marked when the rays were filtered through aluminum.

Filtration now being established on a sound basis, the demand for larger sources of energy became insistent.

Clyde Snook[10] of Philadelphia in 1906 developed the "interrupterless transformer." This invention placed at the command of Roentgen therapists a machine which functioned properly and gave a tremendous increase in the amount of radiation available. The fact that this original machine is still being employed at the University of Pennsylvania shows how well Snook visualized the needs of the future. His cross-

*Thesis read before the Minnesota Academy of Medicine, November 13, 1935.

arm type of rectification with the elimination of the unsatisfactory mercury interrupter was one of the two major advances in Roentgen therapy since Roentgen's discovery.

The second advance was made in 1913 when W. D. Coolidge[2] of the research department of the General Electric Company invented the hot cathode tube which bears his name. The development of this tube was the direct result of Dr. Coolidge having only a short time before invented a method of making the tungsten ductile.[1] Thus, in one discovery, Coolidge removed two of the greatest obstacles to human endeavor; the carbon filament electric light, and the unstable, fragile and inefficient gas x-ray tube.

It was my privilege and pleasure to use in x-ray therapy the first Coolidge tube manufactured.

These two scientists, Snook and Coolidge, have contributed more to Roentgen therapy than all of the combined work of other men since the time of Roentgen.

Following the development of a reliable source of energy and an x-ray tube capable of handling the energy, the next natural step was the development of an apparatus to measure the dosage delivered to varying depths of the human body. After various attempts by many men, both roentgenologists and physicists, both here and abroad, a satisfactory ionization chamber was developed in 1924. At first these instruments were used to calibrate x-ray machines. Now, in the most modern machines, they are built in as an integral part of the machine and constantly register the amount of radiation being delivered at various depths during the administration of the treatment. The further tremendous advantage is the safeguard, that if a filter or any part of a filter be omitted, this fact is immediately apparent on the electric iometer on the control board.

During this period of time, radium had been discovered and was becoming more and more popular as a source of therapeutic radiation. The similarity of the physical characteristics and biological effects of these two sources of energy had been noted, and the further fact that the two could be advantageously combined led to the combined roentgen-ray radium treatment.

The use of radium locally in localized cancer of the cervix of the uterus produced, and is still producing, many spectacular cures. The effects of radium employed locally is unfortunately sharply localized to the area to which it is applied. Thus an enormous number of carcinomas which extended beyond the confines of the cervix could not be reached by radium.

This led to two developments: (1) the accumulation, where possible, of sufficient radium to construct a bomb for external radiation to supplement local applications of radium; (2) to x-ray manufacturers gradually developing larger machines and tubes of a larger capacity in an effort to approach radiation equal to the gamma rays of radium.

In 1921 a machine was developed which would produce 30 milliamperes of current at 200 kilovolts. A water cooled Coolidge tube capable of handling this amount of current was developed shortly thereafter.

With the advent of this machine and tube the results in the combined treatment of carcinoma of the cervix of the uterus made a marvelous advance. The amount of energy employed by this apparatus permitted still more of the softer or non-penetrating rays to be filtered out. Copper then came into use as the main filter, with a small amount of aluminum still being retained. This permitted larger dosages of radiation to reach deep seated tumors without permanent damage to the intervening structures.

Notable progress was made under 200 kilovolts in deep x-ray therapy especially when it could be combined with radium employed locally to the lesion. There still remained, however, a large group of deep seated tumors, where the local application of radium was impossible, where it was impossible to deliver a lethal cancer dose through the skin surfaces without doing irreparable damage to the skin. The few clinics who had enormous amounts of radium were able to treat this group of cases by the external application of the highly filtered radium. Those of us not so fortunate in the supply of radium merely retarded the rapidity of the growth, or treated the symptom-producing metastases as they occurred.

Two years ago the General Electric X-ray Corporation built three x-ray machines of pulsating current type capable of delivering 800 kilovolts and also constructed an oil cooled tube capable of handling this amount of energy.

One of these machines was placed at the University of California, one at the Memorial Hospital in New York City, and one with Dr. Henry

Schmitz at the Mercy Hospital in Chicago. Recently other manufacturers have produced similar machines.

Since its installation it has been my privilege to follow the cases treated by Dr. Schmitz with his machine. He has operated his machine at 400, 600 and 800 kilovolts. When he reached the 800 stage in certain control cases of early carcinoma of the cervix of the uterus he abolished the use of radium locally in the cervix. He feels that the immediate results have been fully as brilliant as in those cases in which radium has been used locally as well. He feels, however, that when voltages of below 800 kilovolts are used, radium locally should still be employed.

The logical conclusion from the above facts, which are as yet unpublished, but which I have been permitted to cite, is that the ultimate in necessary voltage has probably been reached.[8]

Treatment with these pulsating current machines is tedious as each increase in voltage must be met by a drop in milliamperage in order to stay within the capacity of the tube. To compensate for this fact the General Electric X-ray Corporation in the spring of this year produced a constant potential x-ray machine of 400 kilovolt capacity. The simplest example to illustrate the difference between the pulsating current and constant potential machine is the flow of water through a pipe connected directly with the pump, and the flow of water through a pipe connected with a gravity flow tank. The pump represents the pulsating current machine. The gravity tank represents the constant potential machine. On the constant potential machine there is an even flow of current with no variation as it is fed from the condensers directly to the x-ray tube. Consequently, the same amount of radiation can be delivered in the constant potential machine in 80 per cent of the time that it would take a pulsating current machine to deliver a like amount. While this may not sound like an appreciable saving it means that twenty-four patients can be treated with one machine while twenty are being treated with the other. Theoretically we should have a much longer tube life with the constant potential machine. This is a matter of considerable financial importance as the tubes have an average life of only three hundred hours on the pulsating current type of machine.

At the present time no one knows whether we will care to go to voltages higher than 400 kilovolts or not. Our experience at this voltage, while it has lasted only five months, is eminently satisfactory. Not until five years have elapsed can this question be definitely answered.

At the present we can say that with this amount of radiation we are noting rapid disappearance of tumors which were markedly resistant to treatment with the 200 kilovolts. We have also noted rapid sloughing of radiation-sensitive tumors from a too rapid application of this radiation. Perhaps a word about the comparative wave lengths of the different types of radiation would not be amiss. The available wave length of a 200 kilovolt machine is .19 Ångstrom units. The 400 kilovolt machine has a wave length of .045 Ångstrom units. Radium has a wave length of .0022 Ångstrom units. Consequently the 400 kilovolt x-ray machine produces a wave length between three and four times the wave length of radium. From a practical standpoint it would take radium valued at more than a million dollars to equal the output of a 400 kilovolt x-ray machine. Bearing this fact in mind it is obvious that in the future we must look to deep x-ray therapy rather than to radium in the treatment of all deep seated malignancies. Our problem in radiation therapy is to deliver to the tumor from four to eight times the dosage necessary to produce a surface erythema, without doing irreparable damage to the skin and other intervening structures. This is done by the fractional method devised by Coutard of the Curie Institute of Paris. Two or more portals of entry are used and treatment is administered each day. From eighteen to thirty days is necessary for the administration of a lethal cancer dose. The average period of treatment is twenty days.

If at the end of six weeks after the last treatment has been administered we are led to believe the tumor has not been thoroughly eradicated a second series of treatments is administered.

Three factors enter into the determination of whether a given tumor is amenable to radiation therapy or not: First, the pathological examination of material obtained by biopsy. As a general rule the more cellular the growth the more likelihood of favorable response. Second, the rapidity with which the tumor has developed. The more rapid the growth, the more likely a

rapid disappearance under therapy. Third, the type of epithelium from which the tumor arises. For example, most bladder tumors are very sensitive to radiation while most rectal tumors are highly resistant.

Tumors arising from lymphoid tissue are extremely sensitive to even low voltage therapy. Tumors arising from muscle and nerve tissue are the most resistant to radiation.

Tumors of certain areas which we have treated with 400 kilovolts and show immediate response may be of interest.

Carcinoma of the esophagus is generally responsive to radiation, but it is unwise to proceed rapidly as these growths are likely to slough rapidly with ensuing perforation. Tumors of the stomach generally respond. Here, too, we are faced with the possibility of a too rapid disappearance and a resulting perforation. Schmitz of Chicago prefers an exploratory laparotomy on all stomach carcinomas and does not radiate those where the involvement has spread to the serous coat.

Carcinoma of the large intestine above the rectum responds favorably. Carcinoma of the rectum is more resistant. We have obtained marked regression but as yet no complete disappearance of the local carcinoma.

Hypernephroma responds favorably. Bladder tumors are as a rule radiation-sensitive and disappear rapidly.

Carcinoma of the prostate, which in the past has shown little response to lower voltage, exhibits marked regression under the higher voltage therapy.

Carcinoma of the cervix of the uterus has always responded favorably to the combination radium and radiation therapy. It is responding much more favorably with higher voltage x-ray therapy which delivers a lethal cancer dose to the extensions of the growth from the cervix in regions which are beyond the reach of the radium placed locally in the cervix.

Inoperable carcinoma of the fundus of the uterus undergoes marked regression under deep x-ray therapy.

Perhaps the most gratifying results we have obtained with the high voltage has been in papillary cystadenoma of the ovary. Unless discovered extremely early these growths in the past have been uniformly and fairly rapidly fatal. From the scores we have treated in the past twelve years with 200 kilovolt therapy we have obtained only two five-year cures. During the past five months we have treated eight such cases with advanced involvement. Two patients died during treatment. One patient is still under treatment and responding favorably. The remaining five patients are apparently well.

Carcinoma of the breast is still a debatable subject. This deep x-ray therapy has been employed too short a time to attempt to draw any conclusions as to its value in postoperative treatment. Most of the statistics on cure in carcinoma of the breast are based on the five-year period. We know that there is a large mortality between five and ten years, and an appreciable mortality even later.

The most comparable statistics as to the value of postoperative radiation in carcinoma of the breast come from two services in the Mercy Hospital in Chicago.[8] One hundred and fifty cases on one service were operated upon and not radiated. One hundred and fifty cases on another service were operated upon and given a thorough course of radiation. At the end of the five years 18 per cent of the non-radiated cases were living. Of the radiated cases 35 per cent were living. This would indicate that there is some value in postoperative radiation in carcinoma of the breast. Whether these figures can be bettered or even equalled by treatment under higher voltage remains to be seen. Certainly these results are better than those I have obtained with similar treatment.

Tumors within the mouth, including those involving the base of the tongue, respond favorably to high voltage therapy. The reaction on the mucous membrane is marked and is attended by much discomfort, but always subsides.

Basal cell epithelioma can be completely eradicated by a cauterizing dose of nonfiltered low voltage x-ray therapy.

Carcinoma of the lip responds to a cauterizing dose of unfiltered low voltage x-ray therapy or to the localized application of radium. It responds equally well to surgical excision. Block dissection of the glands of the neck should be done regardless of the type of local treatment used. The technic followed at the University Hospital for the past several years yields excellent results: local application of radium to the growth, cross-firing of the glands of the neck with deep x-rays, followed by block dissection of

the glands of the neck several weeks later.

Carcinoma of the larynx responds favorably to cross-firing with deep x-rays.

Carcinoma of the bronchus has been held in abeyance for a period of years with x-ray treatment with a voltage of 200 kilovolts. We are in hopes that 400 kilovolt therapy may give even more favorable results. Since we have installed our 400 kilovolt machine we have not had an opportunity to treat any primary carcinoma of the bronchus which had not already metastasized.

Lymphosarcoma and Hodgkin's disease have in the past shown a very favorable response to x-ray treatment with the lower voltage. Unless a case proves refractory to doses of 200 kilovolts we will not resort to higher voltage therapy.

Menopausal bleeding and uterine fibroids are amenable to low voltage therapy and we have not had to resort to higher voltage in their treatment.

Leukemias are best treated with low voltages as the response is likely to be too rapid with the higher voltage therapy.

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MORTALITY IN APPENDICITIS

A Study of Two Hundred and Twenty-nine Cases Taken from the Surgical Services of the Ancker Hospital

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DURING the past few years remarkable progress has been made in medicine and in this period some of the more common diseases, that were given consideration twenty-five years ago, have not received much individual attention. Appendicitis falls into this group. However, in the past few years several studies have shown that the mortality in appendicitis is much higher than most of us have realized.

Twenty-five years ago operations for appendicitis were very common. To be sure many appendices were removed without relief of symptoms and this undoubtedly caused a reaction among the laity, making them less appendicitis minded. The mortality rates recently reported have stirred up a new interest in this very common disease.

It was felt that an analysis of a group of cases treated by different surgeons would be of interest and therefore these cases were selected from the surgical service of the Ancker Hospital. They were treated during the five-year period from 1928 to 1932. There are no so-called chronic or subacute cases included in this group. They are all pathologically proven cases of appendicitis from the acute ulcerative to the more complicated types.

We feel there is no necessity, as a rule, for emergency operations in a case with an appendiceal abscess. On first examination one may find a palpable mass but the signs of severe infection may be absent. This may not be an abscess but merely a mass made up of the appendix and adjacent indurated structures. With expectant treatment these masses often disappear and recovery ensues, but the patient should return at a later date (three to six months) for removal of the appendix. This clinical picture is a sharp contrast to the case with a true appendiceal abscess. These cases show the signs of continued infection and there should not be too much delay before operation is advised.

When a mass is encountered that is retrocecal and the peritoneal cavity is free, the procedure brought out by Karl Meyer is valuable. In these cases he closes the abdomen without disturbing

TABLE I. A STUDY OF 229 CASES OF APPENDICITIS

Total number of cases studied	229	
Males	139	61.0%
Females	90	39.0%
Number of patients operated upon	227	99.1%
Deaths	22	9.6%

Onset of Illness

Cases giving history of first attack	177	77.2%
Gradual onset	124	54.1%
Sudden onset	105	45.9%

Age Incidence

1-10		10.0%
10-20		46.0%
20-30		21.5%
30-40		13.0%
40-50		4.5%
50-60		3.9%
60-70		.4%
70-80		.4%

Duration Illness at Time of Admission

12 hours		13.0%
12-48 hours		58.0%
3 days		10.0%
4 days		6.5%
5 days		3.0%
6 days		.9%
7 days		3.9%
10 days		3.9%

Pain

Severe	95	41.4%
Moderate	118	51.5%
Slight	16	7.1%
Vomiting present	179	78.1%
History of catharsis	38	16.8%

Temperature Curve

98- 99		13.5%
99-100		35.0%
100-101		29.0%
101-102		11.3%
102-103		11.1%

Pulse Rate

70- 80		26.2%
80- 90		18.1%
90-100		15.3%
100-110		17.4%
110-120		10.4%
120 and above		12.6%

Muscular Rigidity

None	35	15.4%
Marked	54	23.5%
Moderate	93	40.6%
Slight	47	20.5%

Abdominal Tenderness

Marked local	74	32.3%
Moderate local	126	54.5%
Slight local	21	9.4%
None	1	.4%
General	7	3.4%
By rectal examination—tenderness in right pelvis	32	13.9%
Average leukocyte count		14,800

Urine Examination

Negative	191	83.1%
Albumen	23	10.0%
Sugar	2	.8%
Pus	13	5.7%

Operative Procedure

Appendectomy	135	59.3%
Appendectomy with drainage	77	33.5%
Drainage	15	6.4%
Not operated upon	2	.8%

Pathologic Diagnosis

Acute ulcerative appendicitis	150	65.5%
Acute suppurative and acute gangrenous appendicitis with perforation	68	29.6%
Acute appendicitis with abscess	11	4.4%

Complications

Wound infections	18
Bronchitis	2
Phlebitis	1
Diabetes	1
Intestinal obstruction	4
Salpingitis	1
Pregnancy	1
Massive lung collapse	1
Pleurisy with effusion	1
Subphrenic abscess	1
Liver abscess	1
Peritonitis	31

TABLE II. FATAL CASES

Number of fatal cases	22	9.6%

Analysis of Fatal Cases
Duration of Illness at Time of Admission

12 hours	1
20 hours	1
1 day	5
2 days	9
3 days	3
4 days	1
5 days	1
6 days	1

Operative Procedure in Fatal Cases

Appendectomy	4
Appendectomy with drainage	16
Drainage	1
Not operated upon	1
Autospies performed	9

Pathologic Diagnosis in Fatal Cases

Acute suppurative appendicitis and acute gangreous appendicitis with perforation	14
Acute appendicitis with abscess	2
Acute appendicitis without perforation	6

Causes of Death

General peritonitis	11
General peritonitis and pneumonia	3
General peritonitis and intestinal obstruction	2
Intestinal obstruction	2
General peritonitis and diabetes	1
General peritonitis and liver abscess	1
Carcinoma of cecum	1
General peritonitis with subphrenic and liver abscess	1
Preoperative diagnosis of general peritonitis	18
Recovered	14
Died	4
Died without operation	1

anything and observes the patient closely. If the condition subsides an appendectomy is performed later. If, however, the abscess progresses he drains it extraperitoneally, thus avoiding the soiling of a clean peritoneal cavity.

Our practice is to operate on patients with general peritonitis of appendiceal origin, after giving them supportive treatment. The appendix is removed if feasible and the abdomen is closed without drainage in some cases, but usually drainage is established.

When a diagnosis is made of acute appendicitis with or without perforation, we feel usually that surgical intervention is indicated. There were eighteen patients in this series who carried an admission diagnosis of general peritonitis, one in such poor condition that operation was impossible. Seventeen were operated upon with three deaths.

Enterostomies were performed in those that developed intestinal obstruction. At the time these patients were being treated the nasal suction for relief of intestinal obstruction was not being used at the Ancker Hospital. It is possible these patients would have fared better if this type of treatment had been employed as it is usually instituted earlier than the performance of an enterostomy. Three patients died from peritonitis and pneumonia. Pneumonia is always a serious postoperative complication and when accompanied by peritonitis one is faced with a most serious situation.

Suppuration in the appendiceal region occasionally leads to a liver abscess, due to extension of a pylephlebitis in the mesenteric vein. This is one complication that is always fatal. Any patient with an infection that does not progress satisfactorily should always be closely observed for the localization of a suppurative process and the subphrenic abscess is a common offender. It should always be kept in mind and when located drainage is indicated.

It is readily concluded that the patient with acute appendicitis who is given immediate surgical relief does not offer the difficult problems of judgment that do those who, for one reason or another, are not operated upon promptly. It is this last group on which our thoughts and efforts must be concentrated in an attempt to lower the mortality rates with which we are faced.

TARSAL SCAPHOID FRACTURES AND THE SUBASTRAGALOID JOINT

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THIS very rare fracture, like that of its brother (carpal) scaphoid in the wrist, is important because, if undiagnosed or improperly treated, a painful, disabled joint will result. In this connection, any severe ankle "sprain" should be roentgenographed for tarsal fracture as well as for malleolar fracture.

Case Report

Mrs. G. B., aged thirty-two, a small, slender woman weighing only 110 pounds, tripped, stumbled and fell with her weight on the left foot. Severe, constant pain in the left foot appeared. When seen one hour later, the only objective findings were a bony protrusion proximal to the first metatarsal, marked tenderness over the area, and pain brought on by rotating the foot laterally, but none on flexion or extension. The roentgenogram (Fig. 1) showed the compression fracture and upward displacement of the scaphoid.

Closed reduction under ether anesthesia seemed successful, but reraying revealed that the reduction was not maintained by the plaster cast.

A small incision along the medial, superior border of the foot exposed a markedly crushed scaphoid, so dislocated that it was removed by incising only a few remnants of ligaments. The tendon of the extensor hallucis longus crossed over its narrowed superior margin. The bony defect was decreased by suture of the interosseous ligaments, astragaloscaphoid and cuneoscaphoid ligaments. Retention in position of inversion was obtained with the foot at right angles to the leg for a period of seven weeks, no weight bearing being allowed. Gradual resumption of use followed with the arch maintained by a support in the shoe.

At the end of three months, after active use of the foot, there was a little pain on lateral rotation, felt in the calcaneocuboid and calcaneoastragaloid articulation, *not* over the area of scaphoidectomy, nor was the dorsal scar tender. Pressure over the painful areas elicited moderate tenderness. Edema of the dorsum

of the foot was noted after standing for some time, but was not marked.

By restricting her walking, and elevating the foot for several hours each day, combined with contrast baths of hot and cold water, the foot is becoming much less painful. For reasons to be considered later, we do not believe a subastragalar arthrodesis to be of value here.

Fig. 1. Roentgenogram showing compression fracture and upward displacement of the scaphoid.

Etiology.—From the cases reported, the most frequent cause of this injury is a fall or jump from a height onto the feet. A sudden checking of the body's weight means that the impact is transmitted to the tarsals, especially the calcaneus, astragalus and scaphoid. If the point of contact is the heel, the calcaneus may be fragmented or crushed; if on the toes, the scaphoid may be fractured, as in Roederer's case.[16] Wright[22] is apparently alone in the belief that "80 per cent of fractures of the tarsal scaphoid occur in women wearing high-heeled, open front pumps, are caused by plantar flexion of the foot on the ankle joint, accompanied, as a rule, by inversion or eversion." Christopher[3] points out that x-rays of feet wearing high heeled shoes demonstrate abnormally wide tarsal joint spaces. In our case, high-heeled shoes were worn, but Crossan's[5] cases followed a fall from a height, as did those of Patel and Berard,[15] Lasserre[10] (first case), Bazert,[2] Wilson and Cochrane,[21] Margotini,[13] Solcard and Rolland,[19] Baetjer and Waters.[1]

Direct trauma by crushing beneath a car wheel was reported by Lasserre,[10] and noted by Baetjer and Waters. Two cases occurring in toe dancers were observed.[1]

Anatomy.—The weight of the body is transmitted through the tibiæ and ankle joints to the tarsal bones. The astragalus, forming the inferior half of the ankle-joint, distributes the weight posteriorly on the os calcis, inferiorly on the sustentaculum tali, and anteriorly on the scaphoid, these relations forming that little-known joint, the sub-astragaloid (the astragaloscaphoid joint is considered a part of the subastragaloid, as taught by G. G. Davis[8]). "This is one of the most important joints in the foot, because the astragalus is here situated at the summit of the anteroposterior arch of the foot,

Fig. 2. The subastragaloid joint is shaded. Calcaneoscaphoid ligament (1); plantar ligament (2); plantar fascia (3). A—astragalus; B—calcaneus; C—scaphoid; D—first cuneiform.

and because the head of the astragalus is received into a socket made up of the sustentaculum tali, the scaphoid and the plantar calcaneoscaphoid ligament."[6]

Clinically, the subastragaloid joint is important because it is *only here that lateral motion takes place in the region of the ankle-joint* (the ankle joint being a hinge joint, and permitting motion only in flexion and extension). The plantar calcaneoscaphoid ligament supports the subastragaloid joint, and with the plantar ligaments and the plantar fascia, maintains the arch of the foot (Fig. 2), and supports the static body weight.

Frequency.—Until comparatively recent years, this fracture was considered excessively rare. Keen's Surgery (1915) and Rose and Carless (1922) do not consider it at all; DaCosta[7] lumps fractures of all tarsals anterior to the midtarsal joint (scaphoid, cuboid, cuneiforms) into a few short lines (1933). European literature[2,10,13,15,16,19,20] contains much fewer cases than does this country's, and frequently refers to their extreme rarity. Wright[22] refers to twenty cases.

Symptoms.—Pain is the predominant symptom; it is severe, steady, increased by attempts to rotate the foot laterally. In older, untreated cases, there is much pain on walking over un-

SUMMARY OF CASES AND RESULTS

Author	Fracture	Treatment	Outcome
Top	Fracture, no dislocation	(1) closed	Pain, attacks of arthritis for four months
		(2) removal of scaphoid	Attacks of arthritis nine months later
Solcard and Rolland	Transverse, with dorsal dislocation	Arch support	Much pain and disability 6 months later
Cotton	Fracture scaphoid, three cases	Open reduction; removal loose fragments	Full regeneration of bone; results good
Margotini	Transverse, with dorsal dislocation	Closed reduction; cast 19 days; massage, passive, then active, movement.	Good function 4 months. No pain on walking. Slight dorsal protuberance
Bazert	Two fragments; slight displacement	Immobilization; light massage later	Good function
Lasserre	1. Four fragments no displacement	1. Foot molded and immobilized 20 days	Returned to work in 3 months
Lasserre	2. Crushed foot	2. Immobilization	Edema, pain, limp at end of 3 months
Patel and Berard	Fracture and dorsal dislocation	Closed reduction	Little functional disturbance
Patel	Fracture, with dorsal dislocation	(1) Closed	Persistent pain and difficulty in walking
		(2) Scaphoidectomy	Complete relief of pain
Crossan	1. Fracture with dorsal dislocation (8 months)	1. Scaphoidectomy	1. Other ankle surgery to be done, so result not known
	2. Fracture, dislocation (3 months later)	2. Scaphoidectomy	2. Relief of pain; light work in 4 months.

even surfaces, for the same reason, namely, that the subastragaloid joint cannot function properly. Crossan[5] emphasizes this point, and that walking for more than a few blocks is quite painful.

Tenderness is found over the scaphoid; swelling, if not seen till later. Bony protrusion on the dorsum of the foot is frequently present. A typical lateral view roentgenogram (Fig. 1) following indirect injury shows dorsal displacement of a flattened, wedge-shaped scaphoid, and closer approximation of astragalus and cuneiforms. Direct trauma or severe indirect violence may result in fragmentation into three or four portions.

Treatment and Prognosis.—These must be considered together, as the ultimate outcome is often directly dependent on the treatment. It is well recognized that tarsal fractures may be disabling for many months, or that there is a considerable percentage of permanent disability in some cases, even in the most experienced hands.†

Closed reduction may be attempted, if the fragments are not separated or if the scaphoid is not markedly deformed or dislocated,[2,3,10,13,15,20] but must be closely checked by roentgenograms, as maintenance of reduction is difficult.[19]

Open reduction seems the procedure of choice,[13] with removal of widely separated fragments.[19] "Full regeneration of bone follows even liberal removal" (Cotton[4]). Careful suture of interosseous ligaments should be done. Excision of the entire scaphoid is indicated if markedly deformed.

Late, unreduced or disabling scaphoid fractures are treated by excision of the entire bone, which usually gives marked relief from the pain.[5,10,15,19] Crossan does not believe that a bone graft is necessary to fill in the bony defect

†See summary of cases; read abstract on Fractures of the Os Calcis, from the French Surgical Congress, Jour. Am. Med. Assn., 105:24, (Dec. 14) 1935.

thus created. It would seem advisable, however, on these anatomic grounds:

1. The internal longitudinal arch being shortened and the external long arch remaining the same length, it is inevitable that the foot anterior to the astragalus would angulate medially, result in lateral strain on the calcaneocuboid and subastragaloid articulations.

2. Removal of a portion of the arch shortens it in the vertical plane, and brings it closer to its base.

3. The astragalus, being no longer supported anteriorly by the scaphoid, tends to rotate forward on the calcaneus. This process might continue to the point of changing the weight bearing surface of the astragalus in the ankle joint. X-rays of our case at the end of ten weeks show that these changes tend to occur.

Subastragalar arthrodesis, suggested by Wilson for os calcis fractures, would prevent painful motion in the subastragaloid joint, but would not prevent 1 and 2 above. Martin[14] states that his results with this procedure have been good.

The suggestion has been made that a portion of the cuboid be removed simultaneously,[11] which would permit closer approximation of the astragalus and cuneiforms, thus restoring direct continuity of the long arch. As the foot would be shortened, bringing it closer to the ground (Fig. 2), this suggestion has not been used to any extent.

Sequelæ of poorly treated fractures include traumatic flat foot,[16] marked pain in the foot on walking, and quick fatigue,[5] deformity of the dorsum of the foot, attacks of "arthritis"[19]; contractures, multiple ankyloses and mediotarsal arthritis.[10]

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The Antianemic Principle of the Stomach

Since the discovery of the effect of liver and of stomach in the treatment of pernicious anemia, many attempts have been made to elucidate the physiologic processes involved and to clarify the nature of the hematopoietic principle or principles of these organs. The experiments of Greenspon (The Journal A. M. A., Jan. 25, 1934, p. 266) now provide a simple explanation for the known facts without hypothesizing the existence of an extrinsic factor. When desiccated stomach was incubated with pepsin and hydrochloric acid and subsequently administered to a patient with pernicious anemia, a reticulocyte response did not occur. Stomach tissue was then depepsinized and administered; a definite hematopoietic effect resulted. The depepsinized tissue incubated with pepsin and hydrochloric acid was inactive; but when it was incubated with hydrochloric acid alone (in the absence of pepsin) reticulocytosis was obtained on administration. Thus it was demonstrated "that (1) the pepsin content of normal hog gastric mucosa could be removed without destroying the antipernicious anemia principle, (2) that peptic activity destroys the antipernicious anemia principle and (3) that hydrochloric acid alone does not." On the basis of his experiments, Greenspon concludes: The beef (or other source of "extrinsic" factor) when incubated with normal gastric juice binds pepsin and prevents it from inactivating the antianemic principle which otherwise occurs unless the precautions adopted by Greenspon are used. Utilizing the knowledge that the antianemic principle in the stomach is inactivated by pepsin, Greenspon has been able to improve greatly on the potency of preparations of stomach tissue developed by Sharp and by Sturgis and Isaacs and of concentrates of gastric juice used by Morris. (J. A. M. A., January 25, 1936, p. 295.)

ANKLE JOINT FRACTURES

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FRACTURES of the ankle joint, like all fractures, are of great antiquity, Cotton says, ever since the Nordic wore brogans, or before.

Mr. Harry Platt says, "The subject of ankle fractures is shown to be an old chapter in the history of surgery and, though a commonplace problem in surgical handicraft, is classical in its antiquity and appears strangely new as each succeeding generation comes fresh to its difficulties, often oblivious of the wealth of knowledge already bequeathed by the older writers."

These words offer a suitable explanation for the constant literature that has appeared on fractures of the ankle since the classical description by Percival Pott, following his injury in 1756. After Pott came Dupuytren, the brilliant French surgeon, who lived from 1777 to 1835 and was the next to contribute to the knowledge of ankle joint fractures. The French, in speaking of Dupuytren's fracture, seem to mean the same lesion that the English do in speaking of Pott's fracture.

After Pott and Dupuytren came Sir Astley Cooper, who, in 1822, described accurately practically all lesions in fracture of the ankle. Scarcely a new one has been found with the advent of the x-ray. Then came Maisonneuve who, in 1840, called attention to the importance of the inferior tibio-fibular ligaments in the mechanism of ankle fractures. In 1872 Tilleaux called attention to a rare result of abduction and external rotation which consisted of a supramalleolar fracture of the tibia, the fibula breaking below the tibio-fibular joint usually, but sometimes above. In 1877 Honigschmeid made 125 experiments on the cadaver to determine the mechanism of ankle joint fractures. In 1892 Stimson made a distinction between fractures produced by abduction and those by external rotation. Since the x-ray many important papers have been published by distinguished men on this subject. Perhaps the most outstanding monograph is that of Ashhurst, published in 1922, with an analysis of three hundred cases.

Fractures of the ankle joint may include the tibia and fibula and astragalus, they may be simple or compound or comminuted, fresh or old with malposition requiring reconstruction operations.

In this discussion only simple fresh fractures of the lower end of the tibia and fibula will be considered.

Anatomy.—Some knowledge of the anatomy of the ankle joint is essential to the proper understanding of ankle joint fractures. The ankle joint is a hinge joint but not absolutely so, as there is some lateral movement, but the main movement is antero-posterior. It is formed above by the tibio-fibular mortise and below by the trochlear surface of the astragalus, which fits into the mortise like a wedge. It is one-fourth wider in front than behind. The projections of the tibia and fibula beyond the level of the tibial roof form the internal and external malleoli respectively. The malleoli form the sides of the mortise. There is a projection on the posterior side of the tibia sometimes called the posterior malleolus. There is a groove on the external lower surface of the tibia formed by the anterior and posterior tubercles into which the fibula fits very snugly. At this point the anterior and posterior inferior tibio-fibular ligaments and felt-like interosseous membrane bind the two bones together most securely. There is a very slight range of motion between the tibia and fibula at this point. The malleoli serve to keep the foot well placed under the leg bones. The astragalus acts as a ballbearing joint and has no muscles attached to it. The ligaments of the ankle joint holding the foot attached to the leg bones are the anterior, posterior, internal lateral, and external lateral ligaments. The lateral ligaments are developed more strongly and hold the joint nearly to a true hinge, permitting only a little lateral movement, the principal movement being antero-posterior. The internal lateral ligament is fan-shaped, passing from the internal malleolus anteriorly to the scaphoid and the os calcis, and posteriorly to the median tubercle on the posterior surface of the astragalus. The external lateral ligament has three distinct bands

passing from the external malleolus, one going forward to the lateral border of the neck of the astragalus, the middle passing down to the os calcis, and the posterior passing to the lateral tubercle on the posterior surface of the astragalus. The posterior band is a very important factor in the mechanism of ankle fractures. It is so strong that it seldom ruptures, and the fibula and astragalus are seldom, if ever, separated in ankle fractures; thus, if the fibula fractures, the fibular fragment and astragalus are carried along together in any displacement. In backward displacement of the foot, the fibula and tibia must either be separated or the astragalus and fibula must be separated. As it is claimed the latter event does not occur in ankle fractures, therefore, in practically all posterior dislocations, as well as lateral, there must be a separation of the tibia and fibula, which means a rupture of the tibio-fibular ligaments. Remembering that the astragalus and fibula do not separate because of this strong attachment, serves as a key to the understanding of ankle fractures. The ankle joint has an approximate movement of about 80 degrees, of which 20 degrees are dorsiflexion and 60 degrees extension, or plantar flexion.

Incidence and Causation.—Kellogg Speed, in reviewing 1,316 fractures at Cook County Hospital, found 208 ankle joint fractures or about 15 per cent. I have reviewed 1,115 fractures occurring in our work at Shipman Hospital and find 151 ankle joint fractures or about 13.5 per cent. It may be said that about one-sixth of all fractures are ankle joint fractures.

Ankle joint fractures are not very common in children, but they are the most frequent of the severe fractures in adults. Most of the cases occur in strong, healthy adults who are leading an outdoor life and are engaged in arduous occupations. The great majority of them are caused by indirect violence. Ashhurst estimated only one per cent due to direct violence, such as crushing injuries, being run over by vehicles and other direct injuries.

There are three types of indirect force constituting the cause of 90 to 95 per cent of ankle fractures. These three forces are: (1) external rotation; (2) abduction or eversion; (3) adduction or inversion; and to these, (4) an upward compression thrust on the ankle mortise.

External Rotation.—Maisonneuve was the first to call attention to external rotation. In this movement the foot is turned or rotated outward on the ankle with the leg bones as a vertical axis, and the strain, which is a torsion or twisting, is felt by the fibula and a spiral or oblique fracture is produced. The fracture is always higher on the posterior surface of the fibula than on the anterior. The obliquity varies and the lower end usually enters the external malleolus. In practically all these fractures the tibio-fibular ligaments are not ruptured and there is no separation of the tibia and fibula. If the violence continues, the internal lateral ligaments may be torn or the internal malleolus pulled off. In some cases the avulsing force is so great as to fracture the whole lower end of the tibia, or cause epiphyseal separation in children.

Abduction.—The second force to be considered, or the next most frequent cause of fracture of the ankle, is that of abduction. In the abduction force the astragalus tends to rotate outward in the mortise and exerts a bending strain on the fibula and great torsion on the internal lateral ligament. It is considered that this is certainly a different mechanism than external rotation because in external rotation the first, and often only, lesion is an oblique fracture of the fibula. In straight abduction the first lesion is either a fracture of the internal malleolus or a rupture of the internal lateral ligament. This has been proven in experiments by Honigschmeid and others. The force continuing, a crushing fracture of the external malleolus below the tibio-fibular ligament is produced—the bi-malleolar fracture by abduction. It is interesting to note the influence of the tibio-fibular ligaments in fracture by abduction. If these ligaments do not rupture, the fracture of the fibula is below the tibio-fibular joint, but if the ligaments tear, thereby allowing separation of the tibia and fibula, a fracture of the bending type occurs, usually in its weakest point, the surgical neck above the lower tibio-fibular joint. The x-ray pictures show the separation of the tibia and fibula and a flexion or inward bend of the fibula. The fracture of the fibula, being of the bending type, follows the law of Messerer; thus it breaks rarely transversely, a little more frequently slightly obliquely, and nearly always is comminuted in a typical manner, as illustrated by Messerer, with a wedge of bone from the concavity of the bend, the apex being directed to-

ward the tibia. In fracture by abduction, as in external rotation, a separation of the whole lower end of the tibia may result, but the fibula fracture is of the bending type and not the torsion or spiral type. In some fractures it may be very difficult to say whether they are produced by external rotation or abduction. A combination of both forces is probably present.

Adduction or Inversion.—The third most prominent mechanism is that of adduction or inversion. The first lesion to occur is fracture of the external malleolus, usually at or below the level of the tibial roof, followed, if the force is continued, by a compression fracture of the internal malleolus from the inward thrust, both malleoli being fractured. It is called bi-malleolar fracture by adduction or inversion in contradistinction to bi-malleolar fracture produced by abduction. These fractures are also called "reverse Pott's." There may also occur a splitting fracture of the tibial shaft due to the weight of the body, forcing the tibia heavily on the displaced astragalus.

Upward Compression.—While the great majority of fractures of the ankle joint are caused by these three forces, external rotation, abduction and adduction, there is still another force to be considered, that of compression, or the effect of the body weight thrown on the injured limb at the time of injury, usually from falls from a height. Its general effect is to increase the separation and displacement from the previous mentioned forces. It also produces the so-called "Cotton's fracture" or posterior marginal fracture of the tibia. Cotton called attention to this fracture several years ago, although it seems to have been known by several of the older writers, including Cooper and Dupuytren. It sometimes occurs as an isolated lesion but usually is associated with fracture of the fibula by external rotation or abduction with gross displacement of the astragalus. It consists of a triangular fragment extending down into the ankle joint in the neighborhood of the tibio-fibular joint. The fragment usually remains attached to the external malleolus by the posterior inferior tibio-fibular ligament and is often displaced backward with the external malleolus and astragalus.

In the production of these fractures, Ashhurst, in a most careful and authoritative study of 300 cases, found that external rotation produced sixty-one, abduction twenty-one, and adduction 13 per cent; in other words, external rotation, abduction, and adduction caused 95 per cent of all ankle joint fractures.

Diagnosis and Clinical Consideration.—In all injuries about the ankle joint in which there is a history of forcible movement of the foot, a fracture should be suspected. Usually the injury is so severe that the patient cannot walk. The foot is usually held in plantar flexion and everted in varying degrees, the internal malleolus being prominent. In the severe cases there are abnormal mobility, especially in the lateral direction of the joint, points of tenderness around the ankle and often great swelling. It hardly seems necessary to detail all the clinical signs in the diagnosis of a fracture with which all physicians are quite familiar, suffice to say that in all ankle injuries a full radiographic examination should be made, especially when there is an indirect forced type of movement such as external rotation, abduction, or adduction. While the more serious types of ankle joint fractures are plainly evident without x-ray, there are many ankle joint fractures in which it is very difficult to determine whether or not a fracture is present. The x-ray picture will always clear up the diagnosis besides showing plainly just what lesions have been produced. Both antero-posterior and lateral x-rays should be taken, as the simple oblique fracture of the fibula may not show with an antero-posterior view but will always show in a lateral, and a fracture of an internal malleolus may not show in the lateral but will always show in the antero-posterior view. Other x-rays at different angles may be taken to assist in diagnosis. The x-ray also shows the varying degrees of displacement of the astragalus in its relation to the tibia. Sometimes these displacements are very slight but they should be considered in the treatment, as perfect reduction of the astragalus in relation to the tibia is very necessary for good recovery of function. Fractures of the ankle joint were first considered as dislocations and many of these are really fracture dislocations.

Prognosis.—Dr. J. B. Murphy once said in his Clinics, "Failure to secure a good result from treatment occurs more commonly in connection with Pott's fracture than with any other type except a Colles'—Colles' fractures more frequently result in a failure to restore normal conformation but one not nearly so detrimental to the

comfort and service of the patient as in the case with a Pott's fracture with poor conformation."

Prognosis in ankle fractures depends largely upon good anatomical reposition and retention over a sufficient period of time for firm healing of bones and ligaments.

Not only must normal alignment of the foot antero-posterior and laterally be obtained, but the tibial plafond and malleoli must be placed so as to grasp and hold the body of the astragalus. Even with perfect anatomical position a degeneration of cartilage along the fracture line of the articular surface with traumatic arthritis may develop.

Emergency Treatment.—"Splint 'em where they lie." This is a slogan heard and emphasized much now in the treatment of fractures; a very good and correct slogan, and while one might think it new, nevertheless, it is old. Percival Pott recognized the principle involved when he was injured in 1756. He would not allow himself moved, but lay on the cold cobblestones of a London street until proper material was brought and his leg well splinted. As emergency treatment, fractured ankles can be splinted with a pillow or by well padded lateral board splints for transportation to the hospital.

Treatment.—As Conwell says, fresh fractures of the ankle resolve themselves into two main groups, those with no displacement and those with displacement. Those with no displacement comprise a large percentage, but one should be very sure after careful x-raying and study of the fracture that there is no displacement of fragments before placing a fracture in this group. This group may comprise practically all fractures of the ankle joint, as one or both malleoli, the articular surface of the tibia and its margins, and supramalleolar fractures. Having determined no displacement, fixation can be done at once without an anesthetic, a circular plaster Paris cast extending from the toes to the tubercle of the tibia with the foot placed at ninety degrees dorsiflexion and in about mid-position between adduction and abduction so that a line dropped from the middle of the patella will pass between the first and second toes. If there is little swelling, very little padding need be used. The Stimson molded lateral and posterior splint of plaster Paris may be used with satisfaction. Speed has also used just a single external lateral splint winding around the foot at the lower end. If there is considerable swelling, a larger amount of padding may be necessary. The patient should be put to bed and foot elevated and watched carefully for twenty-four hours for the appearance of pain, swelling, coldness, cyanosis of the toes; if these signs appear, the cast should be split at once and loosened. Usually at the end of two weeks it may be necessary to apply a new and better fitting cast because the swelling has gone down. The foot and leg have shrunk and the cast has become loose. At this time one may use one of three general methods: (1) a permanent fixation cast, allowing the patient to continue on crutches; (2) a fixation cast, incorporating a steel walking strip of the Boehler type and allowing the patient to walk on this support instead of using crutches; (3) a strong cast, bivalving it so that it may be taken off daily and the leg given massage, bathing, passive and active movement (short of any pain) and general physiotherapy and electrical stimulation as carried out by Clay Murrey of New York City. Weight bearing is usually not begun for six or eight weeks depending on the severity of the fracture, this to give plenty of time for firm union of bones and torn ligaments. When all splints are off in six to ten weeks and weight bearing is begun, a shoe with a stiff shank should be worn, also an arch support may be used, and a Thomas heel raised slightly on the inside with a leather sole raised also on the inside, this to give support and to prevent pronation of the foot. Sometimes it is necessary, in addition to this, to provide the Jones outside iron brace with inside T-strap to give proper support and to keep the foot inverted. Wedging the inner side of the shoe is an old practice used by Ambroise Paré.

In the case of the group of ankle fractures with displacement, the reduction should be done at once. No matter how much swelling, we have never waited for the swelling to go down. If it is very great, much of it may be reduced by massage. In doing the reduction, an anesthetic should always be used, either local, general, or spinal. One surgeon wrote me that he preferred spinal to any other as it gave better relaxation for reduction in the badly dislocated ankle joint fractures. We have used general anesthetics oftener than anything else. We have also used local and spinal. In reducing these ankle fracture dislocations it will assist to re-

member that the malleoli which are broken off tend to move with the dislocated astragalus and that the malleoli which are not fractured tend to be separated from the astragalus because of the loosening of the lateral ligament on that side. Anatomically the astragalus is bound firmly to the foot, and the foot can be used as a lever in reducing the astragalus. In considering displacements, Conwell says one should determine whether or not the distance between the malleoli is broadened, whether or not the astragalus is in its normal position, whether or not the external malleolus is pushed backward, whether or not either malleolus is displaced upward and whether or not the normal contour of the lower end of the tibia is present. After the reduction is made, a plaster cast may be applied extending from the toes to midway of the thigh, the knee bent in slight flexion, the foot usually in slight inversion except in the case of bi-malleolar fractures when there is danger from inversion of the foot of bringing the external malleolus under the tibia and crowding the internal malleolus too far inward. The best position in these cases is to place the foot about midway between abduction and adduction with the astragalus squarely under the tibia and the foot in dorsiflexion of ninety degrees. The patient is put to bed and treated in the same manner as the case without displacement except that in some of these severe fracture dislocations weight bearing cannot be attempted for ten weeks. In these bad dislocation fractures of the ankle, several manipulations are sometimes necessary before a satisfactory reduction is obtained. One dislikes to submit a patient to several attempts at reduction and there is a temptation to accept a reduction that is not quite satisfactory. The courageous attitude is to tell the patient the exact situation and insist on further manipulation. In this connection, however, it sometimes surprises one to find that an ankle joint fracture that has not satisfied the surgeon as to reposition and conformation, and which seems a poor functional result at first, will after one to three years be very satisfactory, at least as to function. But the rule in all joint fractures is to get as perfect apposition as possible. In fractures of long bones this is not so necessary so long as alignment is good. The so-called Cotton's fractures, especially when combined with internal and external malleolar fractures and dislocations of the astragalus, are troublesome and difficult to reduce. Reduction of these troublesome posterior and lateral dislocation ankle joint fractures combining a Pott's and Cotton's fracture is best done by placing the knee in semiflexion and making traction and counter-traction on the foot in slight plantar flexion; the heel and foot is grasped and pulled in line with the leg. When the foot has been pulled down to the normal position, the posterior displacement is corrected by pulling the foot directly forward, counter pressure being maintained on the front of the leg. The posterior fragment of the tibia in the Cotton's fracture is reduced and held by strong dorsiflexion, and inversion done to correct the displaced external malleolus. If both malleoli are fractured, care must be taken not to invert too strongly. The cast is then applied with the foot in slight inversion and dorsiflexed about ninety degrees, care being taken to prevent a dropping back of the foot on the leg while putting on the cast.

Fig. 1. Complicated ankle joint fracture consisting of: (1) fracture of both malleoli about the level of the ankle joint; (2) posterior malleolus fractured—so-called Cotton's fracture; (3) dislocated astragalus, outward and backward, carrying with it the external malleolus. This probably constitutes the so-called trimalleolar fracture mentioned by Henderson.

Henderson says the two fractures of the lower extremity that leave in their wake the most serious disabilities are certain fractures of the ankle and of the hip. Henderson speaks of a tri-malleolar fracture of the ankle which is a Pott's fracture plus a Cotton's fracture. With such a fracture there is tearing off of the internal malleolus, fracture of the external malleolus or fibula in the lower two and one-half inches, and fracture of the posterior malleolus; hence the term tri-malleolar.

Quoting from Henderson, these fractures should be reduced at once. They seldom require open operation. The astragalus must be brought forward and replaced in its normal position in the mortise between the malleoli. An x-ray antero-posterior shows a slight convexity of the articular surfaces of the lower end of the tibia and concavity of the astragalus. Laterally, an opposite condition prevails. The convexity of the astragalus fits into the concavity of the tibia. If these two surfaces fit antero-posterior and laterally, little attention need be paid to slight displacement of malleoli, although it is well to have the malleoli in as good position as possible and especially should the tibia and fibula be pressed well together if there be a diastasis or separation of the tibia and fibula at the tibio-fibular joint. Very rarely does it seem necessary to do open operation on ankle joint fractures. Those fractures that do require it are usually those in which in the Cotton's fracture the posterior fragment with its upward displacement keeps recurring after all attempts to reduce it and keep it in position. Sometimes it may be necessary to fasten a malleolus in place by nailing or other means, or to secure a tibia and fibula together by foreign material when the diastasis is not easily overcome or if it tends to recur after reduction. Skeletal traction with the Steinmann pin, or Kirchner wire through the os calcis may be useful in those fractures of the tibial articular surface which recur after reduction by manipulation.

There is a great impetus in the profession at the present time to improve the treatment of all classes of injury and to cut down the time of disability, and especially fractures. A new specialist, the industrial surgeon, seems to be evolving.

Dupuytren said, over one hundred years ago, of ankle joint fractures, "Under the most favorable circumstances, they almost always leave a deformity and lameness which renders progression difficult and painful."

With our present-day knowledge, the x-ray and facilities for care of these fractures, Dupuytren's dictum should lose its sting.

PHYSIOLOGIC FACTORS RELATING TO SURGERY OF THE COLON*

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THE functions of the large intestine are not of such prime importance in human economy as are those of the small bowel, and neither are these functions so many or so varied. That the small intestine, or a large portion of it, is indispensable to the maintenance of life is an established fact; however, this does not hold true for the large bowel, since life can be sustained more or less adequately in the total absence of this organ. It was even considered for a long time that physiologic activities of the colon were limited to those of a catch basin for the reception and retention of feces until a convenient time for evacuation arrived. However, in recent years, additions to our knowledge of the many uses which the large bowel serves have given us a better insight and understanding in the diagnosis and treatment of the diseases of this organ and consequently improvement in results from such treatment.

The large intestine is distinctly a double organ, being made up of essentially the right and left portions, facts which may be substantiated by evidence taken from its embryologic development, from its anatomical structure, from its

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physiologic functions and finally by the difference in effects resulting from disease in its various segments.

The bifunctional nature of the large intestine is especially obvious when one considers the embryologic development of this organ. The right or proximal one-half of the colon is derived from the midgut along with that portion of the small bowel distal to the papilla of Vater. All this segment of the intestinal tract is an absorptive one and extends distally as far as the splenic flexure. The mechanism which brings about these anatomical relations is one of prenatal rotation of the colon around the superior mesenteric artery in a counter clockwise direction. An attachment of the colon in the region of the splenic flexure is made in the early months of fetal life, and by the third or fourth month another attachment has been made under the liver, thus giving origin to the hepatic flexure. The left arm of the colon, that portion distal to the splenic flexure, takes origin from the hind gut. The distinct dissimilarity of development of the two portions of the colon again impresses one as to differences in physiologic function of the two arms.

From anatomical relations and differences in structure of the two portions we are again impressed with the bilaterality of the colon. The absorptive portion of the intestinal tract along with the proximal segment of the large gut derives its blood supply from the superior mesenteric artery and its branches, as indicated from studies of the embryological development in this region, while the left colon, being derived from the hind gut, takes its vascular supply from the inferior mesenteric artery. Furthermore, the right colon with its large diameter, its capacious lumen, and its thin walls is ideally adapted for functions of absorption and it is even true that the cecum at times, especially in some animals, has been regarded as a second stomach. The content here is semi-liquid and the propulsion of feces in this region is slowed down and regulated by small churning movements. In contradistinction the left colon has strong muscular walls which are more fixed; its mesentery is shorter and the diameter of the gut here is smaller and, as a result, much more suited for purposes of evacuation. Furthermore, the contents in this location are hard and the movements here are large strong ones, further enabling propulsion and expulsion. The importance of these facts in relation to surgical procedures will be dealt with later.

A study of the mode of development and the physiologic effects of disease in the two segments of the colon likewise indicates differences in the type of lesion found, as well as differences in the effects on the individual. Pathologic lesions affecting the right side of the colon result in disturbances of physiologic equilibrium, such as anemia and toxemia. In fact, it is not uncommonly found that this type of anemia may be very profound although unattended by any visible loss of blood so that, in the absence of other symptoms, diagnosis may be obscure. It has become axiomatic that in cases of this nature a roentgen examination of the colon should routinely be made. In sharp contrast to the signs of disease of the right colon are those of the left colon, where obstructive phenomena are quite constant and take place early. These obstructive features are the combined result of two factors: the anatomical characteristics of this portion of the bowel and type of the growth. The distal half of the gut, especially from the splenic fixture downwards, is thicker, its walls are more inelastic and its lumen is smaller than that of the proximal colon. In addition, growths here are of the encircling "napkin ring" type, a combination of conditions which favor early stenosis. In fact it is not uncommon to find cases of this nature in which the first clinical sign of the presence of carcinoma is complete obstruction. These patients present a particularly difficult problem, since one of these conditions alone is very dangerous and when the two are combined, the risk is enormously increased.

It is thus evident that, because of the bifunctional nature of the large intestine, most diseases, especially those of a surgical nature, should be regarded differently, depending upon the location in the colon of the lesion. This is especially true when one comes to a consideration of problems involved in resections of the colon. In the distal portion of the large gut, it is usually much more dangerous to resect a segment and make a primary anastomosis in one stage than it is to first employ a drainage operation, such as a colostomy or cecostomy, and sidetrack the fecal current. On the other hand,

it is relatively safer, in right colon lesions, to do a short-circuiting operation and in addition to resect the diseased area at one sitting, depending, of course, to a large extent, on the general condition of the patient and characteristics of the lesion. The factor of obstruction is rarely encountered when considering the treatment of lesions in the proximal colon. Aside from the question of relieving obstruction in left colon lesions, and of doing graded operations where the general condition of the patient comes into consideration, there is another factor of which cognizance is not often taken.

Peristaltic movements of the distal colon, as well as anatomical conformations of this portion of the gut are of a distinctly different nature than those of the right colon and small bowel. In the distal large bowel, the thick muscular walls have for their purpose forceful, strong movements which are distinctly prolonged and are made under considerable tension. In fact, tonus waves here may last as long as ten to fifteen minutes. In addition, there are superimposed on these long contractions smaller contractions often lasting one to two minutes. Thus it is evident that, with such prolonged tension on an anastomosis, healing would be very difficult, largely because of the local ischemia which is produced. This is further evidence as to the value of preliminary colostomy (Larson and Bargen). Furthermore, the contents of the left colon are rather hard and incompressible, and this condition, combined with relative fixation of the mesentery, tends to favor pulling apart the suture lines of an anastomosis. The blood supply in this region is not as abundant as it is in the small bowel, another factor tending to retard healing, since any tension on suture lines results in further ischemia of the anastomosed margins and gives increased chance for infections to gain headway, consequently there is greater possibility of failure of the tissue to heal. If a preliminary drainage has been done, resection of a segment of bowel followed by anastomosis is more liable to heal satisfactorily for several reasons. The first, of course, is the side-tracking of the fecal current and the decompression of the bowel. Secondly, since a certain amount of peristaltic motion of the bowel is due to impulses traveling along the muscular layers, interruptions of these muscular fibers by cutting across the bowel in making a colostomy results in many of these waves being stopped and they cannot jump from the proximal to the distal stoma. This has the effect of keeping the side-tracked loop of gut much more quiet with consequent avoidance of tension on suture lines. It is, of course, true that the latter segment contains no fecal material and that it can be cleansed readily so that inflammatory reactions may subside and exudates may be absorbed, but the factor of inactivity is, likewise, an important one in successful promotion of healing.

It is true that the mesenteric nerves (sympathetic fibers), which run along with the blood vessels, do reach the bowel wall regardless of interruption of continuity of the gut, as demonstrated in a previously published communication (Larson and Bargen). However, the main motor nerve to the colon, the pelvic nerve (or nervi erigentes), supplies only the distal portion of the left colon and this nerve plexus lies on the surface of the bowel wall between the muscular layers. Consequently, it is readily understandable why motor impulses through the gut are interrupted by section of the bowel. When reëstablishment of the continuity of the bowel is again made, coördination of the intestinal movements is usually resumed in a relatively short time with no particular difficulty, although it is rather common to find that some difficulty in bowel habits is experienced for some time. A parallel situation exists in many cases of local pain occurring post-operatively after appendectomy. It is usually true, when recurrent pains are present for a time after removal of the appendix, that adhesions are considered to be the source of this embarrassing discomfort, and this is no doubt possible in many instances, On the other hand, I am convinced that, in many instances, this pain is due to interference with conductivity of nerve impulses through muscle tissues resulting from removal of the appendix. This has the effect of temporarily producing stasis in the proximal cecum, or at least an incoördinated motility in this region so that pain, flatulence and other symptoms result. The symptoms frequently continue for varying lengths of time until reëstablishment of normal motility has been made.

In the pre-operative and post-operative management of individuals harboring diseases of the colon, all factors are directed towards producing

and maintaining physiologic rest of the bowel so that healing without complications may be facilitated. Pre-operatively, a diet low in residue, emptying of bowel of gas and fecal content by properly controlled catharsis, cleansing enemas, and final intestinal sedation along with supportive measures intended to improve the patient's general condition, all are intended to have the bowel at the time of operation empty, collapsed, quiet and clean. Post-operatively, we have routinely employed, to very great advantage, continuous nasal catheter suction siphonage to prevent the entrance of air into the intestinal tract, a procedure which eliminates, to a large extent, any gaseous distention and consequent aggravation of peristalsis. After distention, nausea and vomiting have occurred, they can be relieved by this suction method but ileus is much more easily prevented than relieved. It should be kept in mind that the extent of surgical trauma within the peritoneal cavity, the length of anesthesia and the general condition of the patient are other factors which determine the degree of ileus to be expected post-operatively. Morphine in frequent moderate doses has a beneficial effect because of its property of relieving pain, restlessness, thirst and apprehension, as well as its ability to increase intestinal tone. Its tonic effect results in maintenance of the proper absorptive function of the bowel so that toxemia is definitely lessened since it has been proved that distention of the gut is notably accompanied by absorption of toxic products. Constipation frequently accompanies the use of morphine and is most likely the result of inhibition of the defecating reflex, accompanied with increase of tone of the sphincters. A compensatory diarrhea frequently develops after withdrawal of morphine and its mechanism is obvious. The most important factor in prevention of intestinal activity is the withholding of food and fluids by mouth. In our opinion, with the act of swallowing, even though it be only a small amount of water, and especially with the ingestion of any solid food, a peristaltic wave is initiated which usually travels the entire course of the intestinal tract down to the anus. This increased activity is very prone to spread any inflammatory process which may be present in the peritoneal cavity. When the propulsive power of the bowel has been regained as evidenced by motility of gases in the abdomen (gurgling, et cetera), fluids and, later, food may be administered orally and these, along with heat to the abdomen, are an excellent stimulus to complete recovery of normal bowel activity.

It is best, in any patient who goes without ingestion of fluids and foods for any length of time, to stimulate flow of saliva, especially from the parotid gland, by use of chewing gum, or the sucking of lemon. This definitely lessens the incidence of post-operative parotitis. In brief, the less the swallowing, the less the peristaltic activity initiated.

Fluids, combined with saline or glucose, or both, in these cases are best administered through the intravenous route, less satisfactorily by means of hypodermoclysis. Proctoclysis, of course, in any type of colon operation is contraindicated since fluid given by this method can only be absorbed by being carried over into the right colon, a process which is evidently carried out by a mechanism of antiperistaltic waves, and, of course, the latter would, therefore, have considerable effect on the retardation of the process of healing.

The factors mentioned have, primarily, for their purpose the promotion of local healing in the bowel by means of quieting peristalsis and by increasing the tone of the bowel, but, of course, measures which increase the general resistance and condition of the patient must not be neglected, such as transfusions, large amounts of parenteral fluids, and so forth. In the immediate convalescence of the patient, after four or five days, it is wise to start, very judiciously, the use of clear fluids, then soft foods and finally, as determined by the tolerance of the patient, a diet high in calories and vitamines, but low in residue. As time goes on, the patient will find out for himself the type of food best suited to his needs. After ileostomy an important problem arises concerning the maintenance of a positive fluid balance, especially the first few weeks, post-operatively. Since the absorbing portion of the colon is out of the circuit and is non-functional, large amounts of fluids must be given, preferably intravenously, to prevent dehydration. The lower ileum, however, in time takes over the function of the colon as regards absorption so that a return to normal health as far as the ileostomy alone is concerned may

be expected. In ileocolostomy, especially ileosigmoidostomy, frequent and loose stools may be a rather persistent symptom, but by the judicious use of a proper diet, this can practically always be controlled. Compensatory changes, both in the anatomical and physiologic makeup of the bowel take place to aid in a return to normal conditions. Patients who have had a colostomy usually experience a temporary looseness of the stools, varying in degree and duration but eventually these individuals establish a marked regularity in their evacuations. They soon experience little inconvenience in the care of the stoma except during acute intestinal upsets when the watery discharges may be so uncontrollable as to require attention at the most unexpected moments. Patients who, prior to colostomy, are naturally constipated, have the least inconvenience in the regulation of their habits. Here, again, the individual himself soon learns by experience best as to his dietary and other habits so that most of these patients do not feel themselves handicapped in the ordinary duties of life by the presence of a colostomy or ileostomy.

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MYOCLONUS EPILEPTICUS IN CHILDREN

With Report of a Case

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THE term, myoclonus, is taken from the Greek and means, literally, "muscle tumult." It is applied to such diverse and different clinical entities as chorea, paramyoclonus multiplex, tic convulsif, myoclonus epilepticus and various forms of hysteria. It is used as a synonym for many motor disturbances because in all of these disorders there occurs a recurrent or continuous spasm of muscles or parts of muscles. Since a similar case has not been reported for fifteen years, I believe that it will be of interest to relate the following case.

Case Report

G. H., white, female, aged four, was admitted to the pediatric department of the Minneapolis General Hospital, on January 9, 1935, with the following history: On August 18, 1934, the child had a generalized convulsion lasting five minutes, with twitching of individual muscles all over the body, but especially involving those of all the extremities and face. There was loss of consciousness lasting for about five minutes from which the child fully recovered. There was no concomitant illness during this first attack. During the next five weeks, similar convulsions occurred with gradually increasing frequency until they appeared daily. The attacks began with a deep gasping breath, coarse tremors of the upper extremities which spread upward to the face and downward to the legs. The patient never bit her tongue nor injured herself in any way.

In the latter part of September, 1934, the patient was put on calcium therapy but with no effect. During October and November, she was given a ketogenic diet. At this time the muscular convulsions disappeared. This diet was discontinued December 1, 1934, and for the next two weeks the child was well until she developed an upper respiratory infection. Then the convulsions reappeared two and three times weekly until her admission to the Minneapolis General Hospital.

The patient had been delivered by instruments following a normal pregnancy. Her entire life was uneventful until August, 1934, there having been no childhood diseases. There is no history of family degeneracy, epilepsy or chronic diseases.

The little girl was well developed and nourished, and presented no abnormality except constant and coarse tremors present in both upper and lower extremities.

The child was fully conscious and apparently comfortable. The head was bent slightly forward and to the left. The gait was uncertain, halting and jerky because of the constant coarse tremors and contractions of all muscles of the extremities and face. Acute spells occurred about every hour. During such attacks, speech was indistinct. The convulsions lasted from five minutes to two hours. There was a temporary loss of consciousness at the onset, petit mal in character. The movements varied during each attack, rapid at first and gradually slowing down as the twitching terminated. Swallowing and breathing were normal. Occasional enuresis and incontinence was present but only when emotionally aroused as by a visit of the parents. The abdominal reflexes were hyperactive; all others were normal. The muscle tone and strength were good. The coördination tests consisted of movements which, in the first test, brought the index fingers of

both hands together when the eyes were closed. The second test brought the index finger of either hand to the tip of the nose. And the third test brought the heel of one foot to the anterior tibial region of the other leg. These tests could not be performed during an attack because of the tremors but were carried out normally during quiescent intervals. The patient could not write because of the severity of the tremors.

A spinal tap, performed on January 11, 1935, was negative. Starting on January 15, 1935, and continued daily until January 23, 1935, the patient was given gradually increasing doses of triple typhoid vaccine. This treatment had no effect on her tremors, which continued five to ten times daily. On January 29, 1935, the ketogenic diet was ordered consisting of 129 grams fat, 10 grams carbohydrate and 32 grams of protein. Following the initiation of this régime the attacks diminished both in number and severity until they appeared only twice daily. On February 2, 1935, the total fluid intake was limited to approximately 500 c.c. per day, 275 c.c. of this amount being the water content of the food. The attacks gradually decreased. After February 7, 1935, there was none. On February 22, 1935, the patient suffered a generalized muscular contraction starting at 7:00 a. m. and lasting for two hours. After that there were no more attacks during the remainder of her hospitalization (Table I).

TABLE I

Date	Total fluid	No. of attacks daily	Water content of food in diet
2- 2-35	500 c.c.	2	275 c.c.
2- 3-35	500 c.c.	2	275 c.c.
2- 4-35	500 c.c.	1	275 c.c.
2- 5-35	500 c.c.	1	275 c.c.
2- 6-35	500 c.c.	1	275 c.c.
2- 7-35	500 c.c.	None	275 c.c.
2- 8-35	500 c.c.	None	275 c.c.
2- 9-35	550 c.c.	None	275 c.c.
2-10-35	600 c.c.	None	275 c.c.
2-11-35	650 c.c.	None	275 c.c.
2-12-35	700 c.c.	None	275 c.c.
2-13-35	750 c.c.	None	275 c.c.
2-14-35	850 c.c.	None	275 c.c.
2-15-35	1000 c.c.	None	275 c.c.
2-16-35	1200 c.c.	None	275 c.c.
2-17-35	1600 c.c.	None	275 c.c.
2-18-35	2050 c.c.	None	275 c.c.
2-19-35	2450 c.c.	None	Full diet
2-20-35	2500 c.c.	None	Full diet
2-21-35	2500 c.c.	None	Full diet
2-22-35	2500 c.c.	1	Full diet
2-23-35	2500 c.c.	None	Full diet
2-24-35	2600 c.c.	None	Full diet
2-25-35	2600 c.c.	None	Full diet

The fluid intake was gradually increased, starting on February 9, 1935, until the child received unlimited fluids on February 9, at which time the ketogenic diet was replaced by a full diet.

Urine examinations showed traces of albumin on these occasions and acetone and diacetic acid during the administration of the ketogenic diet.

The electrocardiogram, taken on January 10, 1935, showed a negative T2 and T3, suggesting myocardial damage. When repeated on March 1, 1935, the tracing was normal.

X-ray of the heart and esophagram, on January 15, 1935, showed M.L. 5.8, M.R. 2.7, total 8.5, T.T. 15.8. There appeared to be a slight fullness in the region of the pulmonic conus with slight pressure against the esophagus from the region of the left auricle. The appearance suggested the possibility of a mild mitral stenosis. However, I feel that this finding has no relationship to the disease condition for which the patient was hospitalized. The patient was last seen on August 22, 1935, at which time the mother reported that the child had no further attacks and was on an unrestricted diet. Physical examination at this time revealed a systolic murmur over the apex of the heart and transmitted to the axilla. There also was an accentuation of the second pulmonic sound. A second x-ray of the heart and esophagram revealed essentially the same findings as previously reported.

Herpin was believed by many writers to be the first author to describe myoclonus epilepticus. However, he did not do this specifically, but indirectly, in his general description of the interparoxysmal motor disorders of epilepsy. It was not until 1891 that Unverricht published a monograph describing a number of cases, and called it familial myoclonus, several, although not all, members of the family being affected. Since Unverricht's description, the disease has been called myoclonus epilepticus.

Etiology

According to articles written by Clark and Prout, Rowley and Shanahan, the predisposing causes point toward family degeneracy. The incidence of hereditary predisposition is as high as that of essential epilepsy. It may appear in several generations, either as a direct or as a collateral inheritance. Some of the reports expressly state the existence of degeneracy and others merely imply it. The hereditary influences most frequently found are alcoholism, epilepsy and insanity. No one form takes precedence.

Males are more frequently affected than females in the ratio of five to three. All the cases develop under the age of twenty, 75 per cent developing before the thirteenth year.

Symptomatology

In the development of the disease, the phase of epilepsy appears first in half the cases, in

TABLE II

Myoclonus Epilepsy	Paramyoclonus Multiplex	Epilepsy	Chorea	Hysteria
1. Loss of consciousness, petit mal in character.	No loss of consciousness	Loss of consciousness, grand or petit mal in character	No loss of consciousness	Loss of consciousness, not absolute
2. Warning in some cases, auræ	No warning	Warning in some cases, auræ	No warning	The attack often preceded by emotional excitement
3. Pupils dilated	Pupils normal	Pupils dilated	Pupils normal	Pupils normal
4. Clonic spasms and fibrillary twitchings of muscles	Clonic spasms of individual muscles	Tonic and clonic spasms of muscles	Involuntary movements of a muscle or a group of muscles	Tonic rigidity, exaggerated movements, excessive noises
5. Nystagmus-like movement of eyes, but irregular in direction	No nystagmus	Eyes turn inward and upward	No nystagmus	Eyes staring, sometimes closed
6. No involuntary passage of urine or feces	No involuntary passage of urine or feces	Involuntary passage of urine and feces	No involuntary passage of urine and feces	No involuntary passage of urine and feces
7. Slight stupor	No stupor	Prolonged stupor	No stupor	No stupor
8. Duration of attack, 5 minutes to two hours	Duration of attack 30 to 60 minutes	Duration of attack 15 to 30 minutes except in status epilepticus	Muscle activity constant	Attacks may or may not be frequently repeated.
9. Mentality subnormal later in disease	Mentality normal	Mentality subnormal	Mentality normal or above normal	Mentality normal or above normal
10. Occurs more often in childhood	Occurs more often in adult life	May occur any time	Occurs in childhood	Occurs in adult life
11. Heredity a factor	No hereditary factors	Heredity a factor	Heredity may or may not be a factor	No hereditary factors

periods ranging from weeks to months. In one-third, myoclonus predominates and in the remainder the two appear simultaneously. The disease first manifests itself with attacks of nocturnal epilepsy which may be either grand mal or petit mal in character. Later in the disease, the epilepsy may become diurnal. These seizures may continue throughout life or disappear completely after a few years. They are not typical, in that no aura exists, tongue biting is infrequent and post-epileptic coma never appears. In many cases, consciousness is only partially lost during a seizure.

The myoclonic contractions may be fibrillar or may involve muscle groups, causing locomotor effects. The movements are rapid in nature. The regions involved in order of frequency are: the upper extremity, lower extremity, chest, abdomen, neck and face. Both sides are usually affected, but the movements are not synchronous. The tongue, diaphragm and also the pharyngeal muscles are frequently involved, causing difficulty in swallowing, explosive speech, and a grunting expiration. In the early stages the convulsive movements occur only during voluntary movements and they appear as exaggerated purposeful acts. In the worst forms the muscular strength suffers a marked diminution, and muscular atrophy may occur as a consequence. The strength, extent and frequency of these muscular contractions vary from day to day. Some days the patient may be almost free from any convulsions; other days the attacks may be more frequent. It is rare for the child to be entirely free from evidence of myoclonus.

As a general rule, both the superficial and deep reflexes show considerable hyperirritability. There is lack of physical development, owing to the difficulty in swallowing, which causes malnutrition, anemia and gastro-intestinal symptoms.

Pathology

Clark and Prout believe that the disease is due to an essential defect in cortical control, having found evidence of a meningitis with round cell infiltration of the pia in the region near the blood vessels, a destruction of the internuclear network of the second cortical layer and destruction of the pyramidal cells of the third layer. Williams reported lymphocytic infiltration of the meninges over the paracentral convolutions and extensive infiltration of red cells and lymphocytes in the pia of the cord.

Unverricht suggested that the disease was due to degeneracy of the motor ganglia of the cord brought on by excessive stimulation of an unknown cause. Most investigators agree with this theory because, according to present-day views of cortical representation, this is certainly to be suspected. Coördinated muscular movements, group movements of muscles acting in unison, are represented in the brain cortex, rather than movements of individual muscles which have their representation in the anterior horn cells of the cord. Burr, who examined the brain and spinal cord of one patient, said he could not demonstrate any morbid changes either in the cells of the motor cortex or in the anterior horn cells of the spinal cord.

Diagnosis

The outstanding diseases that require differentiation from myoclonus epilepticus are paramyoclonus multiplex of Fredrick, epilepsy, chorea and hysteria (Table II).

In myoclonus epilepticus the loss of consciousness is petit mal in character, while in the other conditions mentioned, except epilepsy, there is no loss of consciousness. In some cases auræ precede attacks of myoclonus epilepsy and epilepsy. Hysteria also may be preceded by attacks of emotional excitement. In chorea and paramyoclonus multiplex of Frederick there are no warnings. In patients having attacks of myoclonus epilepticus and epilepsy, the pupils are dilated but are normal in the other three conditions. In myoclonus epilepsy there is both clonic spasm and fibrillary twitching of muscles. In the other four diseases there are only contractions of whole muscles. Nystagmus-like movements of the eyes are present in myoclonus epilepsy, but are not present in the other diseases. When a stupor occurs after an attack of myoclonus epilepsy, however, it is of shorter duration than that after an epileptic seizure. In the remaining three diseases no stupor occurs. The duration of an acute attack of myoclonus epilepsy varies from five minutes to several hours. In epilepsy the seizure is of short duration. The activity of chorea is constant. Patients suffering from myoclonus epilepsy and epilepsy have subnormal mentality. In chorea, hysteria and paramyoclonus multiplex the mentality is normal or above normal. Myoclonus epilepsy starts most frequently in childhood while paramyoclonus multiplex appears in adult life. Epilepsy may occur at any time from childhood on. Heredity is a factor in both epilepsy and myoclonus epilepticus; it is questionable in chorea and is negligible in paramyoclonus epilepsy and hysteria. Myoclonus epilepticus and epilepsy are closely associated but myoclonic movements occur but rarely in association with epilepsy. Turner found only two cases among 2,000 epileptics while Shanahan reported seven cases in 2,150 cases of epilepsy. In both these series the myoclonus appeared before the epileptic seizures.

Prognosis

In all the cases reported the prognosis is invariably bad. No cases on record have recovered although long remissions may occur. Patients usually die in early adult life.

Treatment

The treatment of myoclonus epilepticus has been and still is unsatisfactory because of the unknown etiology of the disease. The treatment in this case consisted first of a ketogenic diet, and later of a reduction in the amount of fluid intake.

Inasmuch as myoclonus epilepticus has long periods of remissions the true value of this treatment is as yet uncertain. It will only be by long continued observation that its true value will be determined.

Comment

Although the diagnosis is certain, the patient reported differs in some ways from previous cases reported. There is no history of epilepsy in the family nor any type of family degeneracy. Although a cure cannot be claimed, the symp-

toms, especially the muscular contractions, were allayed by the reduced water intake and a ketogenic diet.

The author wishes to express his appreciation to Dr. Max Seham, for his aid in the preparation of this article.

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CASE REPORT

MUCOCELE OF THE APPENDIX

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J. C., a farmer fifty-three years of age, was admitted to the hospital on January 2, 1936. He had been in good health except for an attack of appendicitis twelve years ago, from which he recovered in a day or two. From time to time since he has had similar attacks which usually lasted for a day or two and were sometimes accompanied by nausea or vomiting. His bowels have been regular.

On January 1, 1936, he developed pain in his lower right abdomen similar to the pain he had experienced in previous attacks. When he came to the hospital he had a leukocytosis of 17,000, temperature 99 and pulse 80. He was tender over McBurney's point with one plus muscle spasm. There was no rebound tenderness and no distention of the abdomen. He did not vomit, but felt nauseated. The day he entered the hospital his bowels moved normally. A diagnosis of appendicitis was made and an operation advised.

Under gas anesthesia the abdomen was explored through a right rectus incision. The gallbladder and stomach were found to be normal. A tumor of the appendix, freely movable, was found at the brim of the pelvis on the right side. This proved to be a mucocele of the appendix. The tumor occupied the distal portion of the appendix; the proximal portion appeared normal. There was no free fluid in the abdomen. There was no macroscopic evidence of acute inflammation of either the tumor or the appendix. The meso-appendix was very much thickened and edematous.

Pathologic report.—Appendix was 10 cm. in length. At the distal end there was a cystic tumor measuring 5 cm. in diameter filled with a thick, clay colored homogeneous substance, apparently sterile. There was no macroscopic evidence of inflammation in the cyst wall. The proximal portion of the appendix was normal in size; its lumen was completely obliterated by dense, fibrous, connective tissue. Sections of the cyst wall showed necrosis of the inner surface with inflammatory reaction and presence of giant cells. There was no definite tubercle formation but these giant cells were suggestive of tuberculosis. There was no evidence of malignancy.

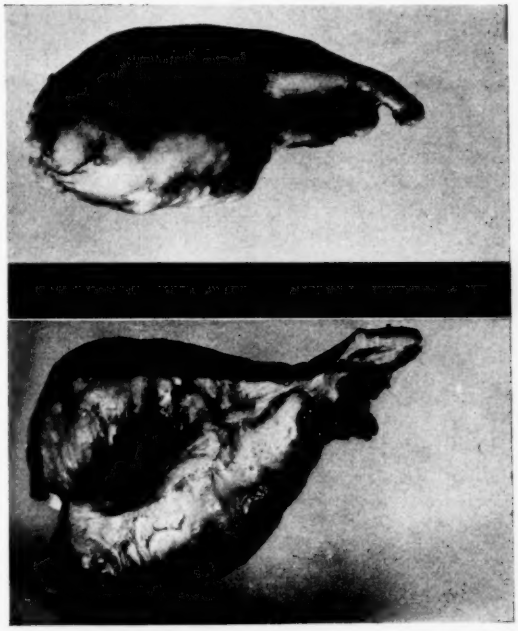

Fig. 1.

The accompany photographs (Fig. 1) give an idea of the size of the mucocele.

CLINICAL PATHOLOGIC SEMINAR*

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Carcinoma of the Esophagus

Case 5.—A woman, fifty-four years old, was admitted to hospital on October 7, 1935, complaining principally of a severe cough. The cough had its onset about August 1, 1935, and was from the first associated with the raising of considerable foul sputum and with some substernal pain. She felt that at the time of onset she "was not suffering from a cold" but that she might have had some fever. She came to the outpatient department on August 19, complaining of "bronchitis" and some difficulty in swallowing; she said that "things seemed to stick in her throat." She attributed the difficulty to an enlarged thyroid and took iodine to reduce its size.

The positive findings noted were an adenomatous thyroid with x-ray evidence of tracheal pressure from the right without compression; x-ray enlargement of the left ventricle of the heart; lung fields clear. Wassermann and Kahn tests gave negative findings; basal metabolic rate was +21 per cent. At the patient's last visit to the outpatient department hospitalization was advised for study of the thyroid.

The cough persisted until she was admitted to the hospital on October 7 and was nearly always associated with the raising of very foul sputum. It had been present both day and night and had interfered with sleep. The position of the body did not seem to affect the cough, but it was definitely aggravated by the taking of food and liquid. On this account she had eaten very little during the month previous to admission. She estimated that she had raised a quarter of a pint of very foul brownish liquid sputum daily; occasionally blood streaking had been noted. In addition to voluntarily diminished food intake, she had suffered definite loss of appetite since the onset of the symptoms and there had been loss of weight. She had been up and about until the week before admission; since then she had been confined to bed. There was cholecystectomy in 1927.

The temperature on admission was 100°; pulse 105; respirations 24; blood pressure 120/86. She was well developed and well nourished. Except for occasional spells of coughing she was lying quietly. Her breath was very foul and her throat slightly inflamed. There was moderate dullness in the right chest from the second dorsal spine to the base. Breath sounds and tactile fremitus were diminished over the same area. Coarse râles were present. No other positive findings were noted.

The urine was normal. Hemoglobin was 75 per cent; leukocytes 15,450. The sputum contained occult blood and pus; elastic fibers were found on two occasions; in stained preparations yeast cells were found, associated with a branching mycelium. Cultural studies showed the organism to be Oidium albicans. X-ray of the chest showed uniform increase in density of the middle portion of the right upper lobe, with a suggestion of some changes in the lower lobe as well.

She continued to cough up very foul smelling sputum, gradually grew weaker and died on October 12, the sixth day of hospital residence.

The clinical impression was abscess of the lung or empyema in communication with a bronchus.

The postmortem examination showed a well nourished woman. The principal lesions were (1) carcinoma of the esophagus of annular form and about 8 cm. in length; the lower end was situated 10 cm. above the cardia; there was a large perforation of the carcinoma on the right side where it communicated with an abscess in the lower lobe of the right lung. The abscess was filled with gangrenous purulent material and communicated with the adjacent bronchus. The right lung weighed 760 grams and showed an extensive bronchopneumonia throughout the lower lobe and in the posterior parts of the middle and upper lobes; less extensive bronchopneumonia was present in the greater part of the left lung. The carcinoma was of the usual squamous cell variety.

Comment: An examination of the esophagus would have revealed the true nature of the lesion. On the basis of the available clinical data a diagnosis of empyema or abscess of the lung communicating with the bronchus, or a carcinoma of the esophagus communicating with the bronchus, was indicated.

Carcinoma of the Bronchus

Case 6.—A man, sixty-nine years of age, noted about January, 1931, a pimple on his right temple. During the next two years this was pricked several times by his barber on the assumption that it was an ingrowing hair. It kept enlarging and in January, 1933, was excised by a surgeon. Microscopic diagnosis was squamous cell carcinoma, grade 2. Postoperative radiation was given.

On April 26, 1934, the patient was admitted to hospital with complaint of recurrence at the site of the original tumor and lumps on the right side of the neck. Examination showed a cluster of papillary lesions 1.5 x 5 cm. on the right temple and several palpable nodes in the right side of the neck. Examination otherwise gave essentially negative findings.

Previous history was unimportant except for the lesion on the right temple and removal of a bladder stone in 1923. Blood pressure was 176/104. Urinalysis findings were negative. Hemoglobin was 96 per cent; white blood cells 6,950 with normal differential; Wassermann negative; temperature normal. Weight 180 pounds. X-ray of chest showed left pleuropericardial adhesions, two small calcified areas in the left lung and no evidence of metastatic tumor.

Twenty-seven mc. of radium emanation was implanted in the temporal lesion and the cervical nodes; the patient was seen at frequent intervals. Decrease in size of both primary tumor and cervical nodes was noted, along with radium reactions; on July 5, 1934, it was noted that "primary and metastases are well healed; no radium reaction." On October 11, 1934, it was noted that there were a few small nodules in the neck, probably gold seeds.

On January 21, 1935, the patient complained of a slightly painful mass of one week's duration in the left axilla; examination showed a node of 1.5 cm. in diameter. The neck was as before. The new node was interpreted as a metastasis from the temple and 10 mc. radon was implanted. Another plate of the chest was made with the same findings as before. Hemoglobin at this time was 84 per cent; white cells 9,400 with normal differential. Urinalysis gave negative findings. By February 28, 1935, the axillary node had shrunk to 5 mm. in diameter.

*Continued from the April issue.

On March 29 the patient complained of a severe cough for three weeks. He was given cough medicine but, as this did not give relief, another x-ray of the chest was taken on May 7. In addition to the previous findings this showed a marked increase in the bronchovascular markings of both lower lobes, interpreted as a lower respiratory infection; no evidence of metastatic tumor. On May 31 the patient was given more cough medicine.

On June 14 he saw a private physician who, because of dyspnea and altered breath sounds, diagnosed collapse of the left lung from obstruction of the bronchus by tumor. The cough continued and difficulty in speech developed which was diagnosed as due to involvement of the left recurrent laryngeal nerve by tumor metastases. Death occurred on August 22, 1935; weight at death about 120 pounds.

The principal postmortem findings were as follows: a decubital ulcer 2 cm. in diameter over the sacrum; pericardial cavity obliterated by old adhesions; small tumor nodules in the left side of the pericardium. The heart weighed 350 grams; valves normal. The left lung weighed 1,000 grams and showed a carcinoma arising at the point of division of the left main bronchus, completely filling some of the secondary bronchi; numerous tumor nodules up to 1.5 cm. in diameter were scattered throughout the lung. The left bronchial lymphnodes were enlarged and filled with tumor. There were numerous abscesses throughout the lung. The left recurrent laryngeal nerve was surrounded and invaded by tumor. There were numerous tumor metastases in the liver up to a diameter of 2 cm. In the middle of the descending colon was a tumor mass 3 cm. in diameter which invaded the lumen from without and did not produce ulceration of the mucosa. There was a small metastasis in the left adrenal. There were metastatic tumor masses in the lymphnodes at the root of the neck and in the left axilla.

Microscopic examination of all the various tumors showed a carcinoma of the squamous cell type with very little cornification. The position of the growth in the left bronchus indicated clearly that this was the site of the primary tumor. There was no evidence of metastases from the original tumor in the right temple. The final diagnoses were: bronchogenic carcinoma of the left main bronchus with metastases to the mediastinal lymph nodes, the right lung, the liver, the glands at the root of the neck and in the left axilla, the left adrenal and the descending colon; bronchiectasis and abscesses of the left lung; pericardial adhesions; involvement of the left recurrent laryngeal nerve by tumor.

Comment: The original carcinoma in the right temple gave rise to the clinical impression that the involvement of the lymphnodes and the lung was due to metastases from the carcinoma of the temple. However, the postmortem examination revealed that the symptoms were due to another carcinoma originating in the bronchus.

Primary Hypertension

Case 7.—The case is that of a man forty-three years old. In September, 1934, it was discovered that he had hypertension, ranging to 230 mm. of mercury. He was seen by a physician on December 12 when he was having dyspnea on exertion, one attack coming on at night and lasting several hours. He had had slight edema of the ankles previous to December. His blood pressure was 204 to 210 systolic, 144 diastolic. There was marked edema of the ankles. The heart was normal; rhythm was regular but there was a sharp aortic second sound. The eyegrounds showed tortuosity of the vessels, interrupted arterioles and arteriovenous compression.

Red blood cells showed 5,080,000; hemoglobin was 88 per cent; white cells 8,000. Intravenous phenolsulphonephthalein showed 51 per cent return at the end of two hours. Urinalysis on single specimens showed a concentration of 1.026; albumin ++ to ++++. Basal metabolic rate was —7. Electrocardiographic tracing showed a diphasic T in lead 1 and negative T in 2 and 3. Fluoroscopic examination of the chest in December showed the heart to be within normal limits.

On June 24, 1935, the patient was seen again. At this time he complained of marked precordial distress, coming on following exertion. He continued to do his usual work, which was rather strenuous. Electrocardiographic tracings now showed upright T in lead 1, diphasic T in lead 2 and negative T in lead 3. At this time the heart was found to be markedly enlarged to both left and right. He had some symptoms of pressure on the esophagus.

He was admitted to hospital September 2 on account of severe dyspnea on exertion. He was unable to continue his work. He had a tendency to Cheyne-Stokes respiration at night and developed moderate nausea and vomiting; edema of the ankles became worse and there was heavy albuminuria. Blood pressure was 220/160. He was nervous and restless but remained rational. The liver edge was 5 cm. below the costal margin. Another urinalysis showed albumin ++++; specific gravity 1.025 with numerous hyaline and granular casts. Urea nitrogen was 23.8 mg. Phenolsulphonephthalein showed 49 per cent after two hours. Blood culture gave negative findings. He was given digitalis to complete digitalization without response; the edema increased in spite of medication and rest; he became very restless; vomited at times and shortly before death became almost maniacal.

The spinal fluid was under moderate pressure. The patient went into coma. On September 27 the urea nitrogen was 92.4 mg.; uric acid 8.8 mg.; creatinin 2.43 mg.; van Slyke 44 per cent. He grew progressively worse and died September 28.

His mother is living and well at the age of seventy-eight; his father died at sixty-one of a stroke; four brothers are living and well.

The principal postmortem findings are as follows: No ascites or hydrothorax. Heart 650 grams; transverse measurement 17 cm.; marked hypertrophy and dilation of the left ventricle; also hypertrophy and dilation of the right ventricle and the right atrium; an accessory mitral valve was present but the mitral valve was apparently competent; the coronary arteries showed only moderate atheroma; no narrowing; no thrombosis; arteriosclerosis of the aorta grade 1 to 2. There was very marked edema and congestion of both lungs, weighing 950 grams and 900 grams; no bronchopneumonia; no disease of the pulmonary arteries; marked chronic passive congestion of the spleen; extreme chronic passive congestion of the liver with extensive atrophy and necrosis of the centers of the lobules. Kidneys weighed 180 grams and 170 grams; surfaces finely pitted. Microscopically there was moderate atrophy due to intimal thickening of the small arteries and arterioles; the changes were such as are found in so-called malignant hypertension but had not progressed to a degree sufficient to cause marked renal insufficiency.

The diagnosis was primary hypertension with hypertrophy and dilation of the heart, edema of the lungs, severe chronic passive congestion of the viscera and moderate atrophy of the kidneys.

Comment: This is a case of primary hypertension in which death was due chiefly to chronic myocardial exhaustion. The sclerosis of the renal arteries and arterioles was also prominent and sufficient to cause some decrease in renal function.

Astrocytoma

Case 8.—A woman, thirty-six years of age, was admitted to the hospital February 6, 1936, and expired February 25 after a stay of nineteen days. She was apparently well until 1933, when she noticed for the first time a slight clumsiness and weakness of the left lower extremity. The weakness grew progressively worse until she had difficulty in walking and was confined to a wheelchair and later to bed. In 1934 she noticed similar involvement of the left upper extremity. The right side of the body was apparently not involved. The involvement of the left side continued to increase. There were no other complaints until August, 1935, when she first began to suffer from headaches, which were localized mostly on the right side and in the temporal region. These grew progressively worse and were constant. At about the same time she developed some dizziness.

At the time of admission she was incontinent and unable to walk at all. She was fairly well developed. The general examination was negative. There was left homonymous hemianopsia and bilateral choked disc. The left pupil was irregular, reacted poorly to light and was somewhat larger than the right pupil. There was supranuclear involvement of the left facial nerve. The patient complained of hypersensibility to pain and touch of the entire right side of the body and decreased sensibility on the left side. The deep reflexes were all increased. There was left ankle clonus and left positive Babinski sign. The abdominal reflex on the left side was not obtained. There was marked weakness in the left upper and lower extremities; the limbs on the right side were normal. Deep sensation was intact.

X-ray examination of the skull revealed complete destruction of the dorsum sella and the posterior clinoid processes. The anterior clinoids were deformed. There was no depression in the floor of the sella.

Urine examination gave negative findings. Hemoglobin was 100 per cent, white cells 10,000. The clinical impression was that of a tumor in the region of the right thalamus extending laterally to involve the right internal capsule, thereby accounting for the left hemiparesis and decreased sensibility of the left side. The tumor evidently must be large enough to obliterate the third ventricle and compress the thalamus on the left side, accounting thereby for the hyperesthesia on the right. An attempt was made to verify this clinical localization by means of ventriculography; a ventriculogram showed a fairly marked hydrocephalus of both lateral ventricles. The third ventricle, aqueduct and fourth ventricle were not visualized. There was some elevation of the floor of both lateral ventricles just posterior to the junction of the frontal horn and the body. The picture was characteristic of a tumor of the base of the brain obliterating the third ventricle and elevating the floor of the lateral ventricles, thereby adhering quite closely to the clinical impression.

At the time of the ventriculographic studies the patient's condition was very poor. She had rapidly gone down hill and had weakened perceptibly. She reacted unfavorably to the ventriculographic studies. Her temperature rose to 103°; pulse became rapid and she expired on the following day.

The autopsy was limited to the head. A large tumor 6.5 x 7 cm. was found at the base of the brain, somewhat more on the right than on the left side; it was fairly well circumscribed. It replaced a large part of the right thalamus and the posterior limb of the right internal capsule. It obliterated the third ventricle and compressed the left thalamus. The sylvian aqueduct was closed by the tumor. The left optic tract was partly compressed but could still be made out. Other cranial nerves were not involved.

Microscopic diagnosis: astrocytoma. This is the least malignant form of glioma.

THROMBOPLASTIC SUBSTANCES: THROMBOPLASTIN SOLUTION-ARMOUR OMITTED FROM N. N. R.

Late in 1934 information was received by the Council on Pharmacy and Chemistry concerning an untoward incident in a large eastern hospital. During the past four years there were observed in the institution referred to four cases of B. Welchii and three cases of B. tetani postoperative infections. The occurrence caused a thorough reinvestigation of all the surgical procedures of the institution. Nevertheless, a postoperative infection appeared from time to time. Late in 1934, according to the statement made to the Council, it seemed advisable to take a culture of Thromboplastin-Armour which had been used in the prevention of postoperative bleeding. To the surprise of the investigator the Thromboplastin was found to contain B. subtilis, Staphylococcus aureus, B. proteus, enterococcus and B. Welchii. As a result of this incident, a bacteriologic examination of samples of commercial thromboplastic preparations was made for the Council. Of the seven preparations examined the following were found sterile: Thromboplastin Local (Lederle), Fibrogen, Local and Oral (Merrell), Hemostatic Serum (Lapenta) (P. D. & Co.), Thromboplastin Local and Hypodermic (Squibb), and Coagulen (Ciba). Examination of Thromboplastin Local-U. S. Standard Products Co., the package of which had been previously opened, revealed aërobic, spore-bearing bacilli. Six specimens of Thromboplastin Solution-Armour were examined and all found to contain numerous bacteria, chiefly spore-bearing aërobes and anaërobes. Streptococci and diphtheroids were found in some, and an organism closely resembling B. Welchii found in five of the six samples. In view of this report the Council voted to omit Thromboplastin Solution-Armour from New and Non-official Remedies until satisfactory assurance is given that its manufacture is conducted under such conditions as to preclude the danger of contamination, and until such time as a number of specimens found on the market shall have been found to be sterile. The Council voted further that all manufacturers of accepted thromboplastic substances be requested to submit evidence of the sterility of their respective products and that no thromboplastic substance be accepted for New and Non-official Remedies until satisfactory evidence is given that the preparation is sterile. When the Council's report was sent to Armour & Co., the firm promptly replied stating that it had confirmed the findings of the Council. It immediately withdrew Thromboplastin Solution-Armour from the market and has stated that it will not promote the product in the future. The Council commends Armour & Co. for the prompt action it has taken. (J. A. M. A., May 18, 1935, p. 1824.)

EDITORIAL

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BUSINESS MANAGER
J. R. BRUCE, Saint Paul

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Annual Meeting

AS we go to press, the annual meeting of our State Medical Association is in the offing. Except for the occasional meeting within our state borders of a national medical association, our annual get-together is the largest and most important meeting of the year.

The tentative program published in our April number will be carried out except for a few minor changes necessitated by illness or other unforeseen circumstances.

This year the unusual clinical facilities offered by the Mayo Clinic will be utilized the first two hours each day. Operative clinics will be held at St. Mary's Hospital, surgical dry clinics in the nurses' lecture room in the hospital and medical clinics in the auditorium of the nurses' home which adjoins the hospital.

A half hour in the mid-morning and mid-afternoon has been set aside for scientific exhibits and demonstrations, a growing feature of our meetings in recent years.

Eminent guests will appear on the program the last hour each morning and the first hour each afternoon. While the guest speakers are fewer in number than last year, their national and even international reputations should prove an attraction.

Members of the Association and the Women's Auxiliary will gather Monday evening at the Methodist Church to hear Dr. W. W. Will, president of the State Medical Association, and Mrs. E. M. Hammes, president-elect of the Auxiliary. We shall also have the opportunity to hear Dr. William J. Mayo and our popular national secretary, Dr. Olin West, on this occasion.

Tuesday evening the ladies will be entertained by Mrs. W. J. Mayo while the doctors will assemble at the Armory for the "Open House" extended by members of the Dodge County Society. On this occasion the exhibit on crime detection methods by the Federal Bureau of Investigation of the United States Department of Justice will be explained by the Bureau's "G" men. If you have visited enough exhibitors' booths and had your ticket punched, you will be eligible at this meeting for the drawing for prizes offered by exhibitors.

The annual meeting will be brought to a close Wednesday afternoon with the Medical Question Court. Dr. W. A. O'Brien, assisted by a group of specialists, will again preside, and last year's success will doubtless be duplicated.

Insulin and Heart Symptoms

ATTENTION has been repeatedly called to the need of caution in the use of insulin in elderly diabetic patients. There have been numerous reports of the appearance of angina pectoris, auricular fibrillation, electrocardiographic changes and even coronary thrombosis, following the use of insulin. The question has been raised whether these symptoms may not be due to the production of a hypoglycemia rather than simply to the use of insulin.

Diabetes predisposes to the development of arteriosclerosis of all the arteries, the coronaries included. The heart in diabetes therefore frequently presents symptoms associated with anoxemia. Glucose is essential to muscle function whether it be of skeletal or heart muscle. The thought has been expressed that the heart muscle becomes accustomed to a rich supply of glucose in the uncontrolled diabetic patient and that a reduction in the blood sugar from the use of insulin accounts for the appearance of heart symptoms. On the other hand, insulin enables the organism to store glycogen in the muscles as well as the liver. It should have a favorable effect on the heart in diabetes.

Certain authors* have recently expressed the opinion, derived from clinical experience, that the factor which accounts for heart symptoms in diabetic patients following the use of insulin, is the production of hypoglycemia and not simply the use of insulin. Their experience convinces them that insulin properly used not only does not produce anginal symptoms, but may even cause heart symptoms to disappear when already present. Their practice is to place their elderly diabetic patients on a fairly high carbohydrate diet (at least three grams per kilo of body weight) and gradually increase the dose of insulin until the sugar disappears or nearly disappears from the urine, not using the blood sugar as a control. In order to prevent the occurrence of a hypoglycemia fifteen grams of carbohydrate in the form of fruit juice is given two hours after each dose of insulin, at which time the insulin action is at its height. The contention of these authors is worth noting.

Nursing Problems

NO one appreciates the value to the patient of an efficient trained nurse more than the doctor. The nurse's part in restoring a patient to health is usually more tedious than the doctor's, and "the laborer is worthy of his hire."

The same law of supply and demand, however, affects the profession of nursing as it does other professions and business in general. If the fee of the trained nurse in any locality is high enough to place her services in the nature of a luxury so far as the ability of the public to pay is concerned, her services will go begging and the nursing profession will suffer.

The question of how much preliminary education and how many years of training are essential for nursing, has received various answers. Is it not possible to demand more preparation of a young woman before she is entitled to be an R.N. than the returns may justify? Might it not come to pass that certain types of bedside nursing may come more and more to be handled by nurses with less training and at a lower wage? Already the practical nurse has found a place for herself, and her field has been widened by recent economic conditions. In one Duluth hospital has appeared the nurse's aid—a young woman in uniform who at a small wage assists at nursing, eats in the hospital, but lives outside.

A year or so ago it was not uncommon for registries in the larger centers in Minnesota to have literally hundreds of nurses awaiting work at one time. There are about half the training schools in the state now that there were a few years ago. Some schools were purposely discontinued in order to reduce the supply of nurses. Others were discontinued of necessity because the rigid requirements for schools could not be met for practical and financial reasons. Some of these hospitals depend entirely on graduate nurses for floor care. The effect of this reduction in the number of schools can scarcely as yet have been felt. With the present increase in the employment of nurses, due to a definite improvement in economic conditions, and the many temporary government positions open to nurses, there is some evidence of a dearth of nurses at present.

The nursing profession is faced with important problems. Nurses, hospital executives and doctors are all concerned in the same activity—the care of the sick—and coöperation between these groups is desirable. That the desire to cooperate exists was shown at a recent meeting of the interprofessional committee representing these three groups. These meetings afford an opportunity for the discussion of common problems and these discussions should be of advantage to all three groups.

*Collens, U. S., Stoliarsky, R. B., and Netzer, S.: Is the use of insulin indicated in the elderly diabetic with coronary sclerosis? Am. Jour. Med. Sci., 191:503, (April) 1936.

Millard Memorial

FOR nearly forty years unidentified, the grave of Dr. Perry H. Millard, first dean of the University of Minnesota Medical School, is to be fittingly marked in June.

Dr. Millard was a pioneer in medicine in Minnesota and was largely responsible for the development of higher medical education and the establishment of the University Medical School. While Millard Hall stands on the University campus as a lasting memorial to his work, his grave in Fairview Cemetery at Stillwater remains sunken in and unmarked.

This neglect is to end this year. A monument is to be erected on his grave with suitable dedication ceremonies by medical leaders of the state. A committee of the Minnesota State Medical Association appointed in 1930, acting with Medical School alumni, has collected the necessary funds and made all arrangements.

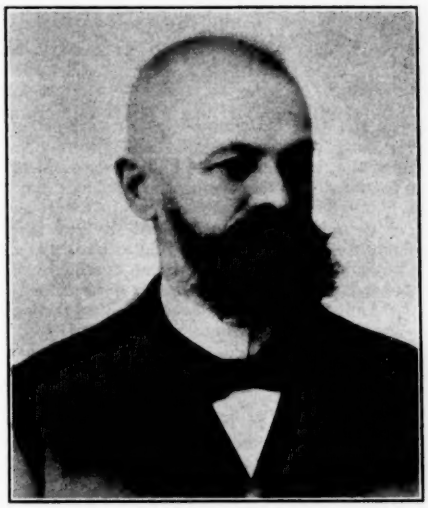
June 7, 2:30 p. m., has been set as the date for the ceremonies and Dr. J. T. Christison of Saint Paul is to give the principal address. There will also be talks by Dr. W. J. Mayo, Rochester, regent of the University of Minnesota; Dr. E. P. Lyon, Minneapolis, Dean of the Medical School; Dr. Guy S. Ford, Minneapolis, Dean of the Graduate School; and Dr. E. A. Meyerding, Saint Paul, Secretary of the Minnesota State Medical Association. Dr. Adam H. Smith, president of the Medical Alumni Association, will be master of ceremonies. Dr. H. S. Diehl, Dean of Medical Sciences, will be present. The entire faculty of the Medical School, as well as the student body, will be invited to attend the ceremony with alumni and members of the Medical Association.

The committee in charge includes Dr. E. S. Boleyn, Stillwater; Dr. W. F. Braasch, Rochester; Dr. J. T. Christison, Saint Paul; Dr. F. A. Erb, Minneapolis; Dr. N. O. Pearce, Minneapolis; Dr. F. J. Savage, Saint Paul; Dr. E. L. Tuohy, Duluth; Dr. C. J. Ehrenberg, Minneapolis; and Dr. E. A. Meyerding, Saint Paul. Dr. C. B. Wright, Minneapolis, as trustee of the American Medical Association, represents that organization on the committee. The late Dr. C. N. McCloud was also a member of the original committee.

Dr. Millard was born in New York in 1848. He came to Stillwater in 1872 and moved to Saint Paul in 1887. Following his death in Baltimore in 1897, his body was brought back to Minnesota, to be buried in Fairview Cemetery. Memorial services were held at the Peoples Church, Saint Paul.

Dr. Millard was first dean of the Medical School, a position he held from 1888 until his death. It was he who was largely responsible for the organization and development of the Medical School and he was the author of most of the laws governing medicine in Minnesota.

During the fifteen year period prior to the 1880's, seven medical schools were created in Minnesota. In 1882 Dr. Millard turned his attention to the situation. Far too wise to approach the matter directly by trying to turn these into one school or creating still another school, he began action in another way.



DR. PERRY H. MILLARD

He discovered a constitutional provision under the State Constitution of 1853 which permitted the Board of Regents to create a department of medicine without teaching functions, but to exercise purely examining powers over graduates of any college. Such a department was created in 1883 with Dr. Charles N. Hewitt of Red Wing as president and Dr. Millard as secretary.

The Legislature of 1883 was induced to pass the First Act to Regulate the Practice of Medicine in the State of Minnesota, requiring all physicians to be licensed, and the Department of Medicine was the examining board. Regulations for recognized medical schools were immediately adopted and forms for examinations established. The Department gradually made its influence felt over the private medical colleges. It stimulated teaching and lifted standards.

But it took six years to bring the private schools to recognition of the necessity for unified medical control. In 1888 they united to create the new Department of Medicine legalized by the Legislature of 1887. However, it was not until 1908, after the death of Dr. Millard, that his work reached its culmination and the last of the private medical colleges was united with the University.

Dr. Millard was named dean of the new department, which included dentistry and pharmacy. In 1894, under his administration, the requirement of a three-year

course was changed to four years, and the six-months yearly semester was lengthened to eight months in 1890. In 1893, a loan of $65,000 from Dr. Millard made possible the construction of the old Millard Hall and the old chemistry building. In 1895 the laboratory of Medical Science was added.

Dr. A. C. Heath of Stillwater, his assistant during those years, has this to say of Dr. Millard and his work:

"Perry H. Millard stands out as the one person with a determined purpose to build a competent medical college of the first rank at the University of Minnesota. Petty factionalisms were much in evidence but never shook him from that purpose. Very fortunate was the University in having Dean Millard in that formative period. He was a determined and courageous executive; with high ideals of medical teaching. Results and progress were always his deciding factors. He felt that the University of Minnesota Medical School was much greater than any man or group of men. The University of Minnesota should indeed be thankful to Dean Millard."

Dr. Millard was also interested in medical organization. He practiced medicine for several years in Stillwater and was instrumental in forming the original Washington County Medical Society. This society was organized in 1882 about ten days before the American Medical Association was scheduled to hold its annual meeting in Saint Paul, and was undoubtedly formed with a view to inviting the American Medical Association to Stillwater.

The invitation was accepted and the feature of the expedition, which was reported at length in the Stillwater paper of the day, was an excursion trip up the St. Croix river from Stillwater. After the river trip, the delegates were guests at the home of Senator D. M. Sabin. Dr. Millard acted as chairman of the meeting which followed the reception.

Dr. Millard was most active at meetings of this early organization. Records show that in 1884 he declared before the society that "influenza" was due to a micro-organism. This observation was based on the results of twelve years of practice. Others reported at the same meeting that they believed the disease due to atmospheric conditions. In the same year, Dr. Millard read a paper on "mastitis," stating that catching cold had nothing to do with it but that lactation and childbirth probably had most to do with it. At another meeting during the discussion on "the inflammation of the spinal cord," Dr. Millard stated that absence of the tendon reflex was diagnostic of traumatic meningitis.

In addition to the monument at Fairview Cemetery, a suitable plaque is to be placed at the University, and surplus funds collected for the memorial are to be turned into the general fund of the Medical Alumni Association.

OBITUARY

Harry Cannon

1872–1936

DR. Harry Cannon, former state senator of the forty-first district in St. Paul, died in San Diego, California, March 23, 1936.

Born in Juneau county, Wisconsin, sixty-three years ago, he was reared on an Iowa farm, worked in a logging camp and two winters in a railroad roundhouse at Albert Lea.

These efforts enabled him to save enough money to be graduated from Cedar Valley seminary at Osage, Iowa, and begin teaching. He was later principal of schools at Raymond, South Dakota, and Anaconda, Montana.

He then studied medicine and was graduated from the medical school of Washington university, St. Louis, in 1904 and came to St. Paul a year later and began his practice.

He retired from practice a short time ago and went to California to live.

Dr. Cannon had planned to return to St. Paul in May and live at St. Joseph's hospital, where he was once a staff physician.

Dr. Cannon joined the Ramsey County Medical Society in 1906, but discontinued his membership in 1931.

Surviving him are six sisters, Mrs. M. A. Montague of Minneapolis; Mrs. P. M. Daly of Washington, D. C.; Mrs. Thomas Geraghty of San Francisco; Mrs. J. J. O'Reilly of Denver, and Miss Kate Cannon of Tacoma. Two brothers, George of Wyoming and James of Ottawa, Ill., also survive.

Charles Leissring Sommers, Jr.

1910–1936

CHARLES L. SOMMERS, JR., son of Mr. and Mrs. Charles L. Sommers of Saint Paul, was born in Saint Paul in 1910.

He attended the Saint Paul Academy country day school from which he was graduated cum laude in 1927, having been active in extracurricular activities as editor of the school paper and member of the student council. He received his B.A. from Harvard in 1931 and then entered Johns Hopkins medical school, from which he graduated in 1935. His rank as fourteenth in the National Board Examinations last spring, is indicative of his student qualities.

Dr. Sommers had his plans made to take further postgraduate work at the University of Minnesota medical school this spring, a year in pathology and a second year in internal medicine, when his career was tragically cut short on April 8, at the age of twenty-six. Taken ill with a sinus infection and bronchitis in February, he developed a heart affection which terminated fatally in six weeks.

Dr. Sommers received the esteem and love of his fellow students for his keen intellect and sense of humor, and this popularity was well attested by the

devotion he received during his illness from the medical and nursing staff of the Baltimore City Hospital, where he was serving his internship.

Besides his parents, Dr. Sommers is survived by a brother, Davidson, who is practicing law in New York, another brother, Frank M., a student at Harvard, and a sister, Elinor Julia, of Saint Paul.

Edwin Oscar Swanson

1891-1936

EDWIN O. Swanson was born in Brainerd, Minnesota, January 22, 1891. He spent his boyhood there, receiving his early education in the local high school.

He graduated from the Department of Medicine and Surgery in the University of Minnesota in 1916 and during the following year served his internship at the Ancker Hospital. He served as First Lieutenant in the United States Army Medical Corps during the World War, after which he engaged in practice in Saint Paul until the time of his death from pneumonia March 29, 1936.

Dr. Swanson enjoyed an extensive practice, and, as a tribute to him, it may be said that he won and enjoyed the respect and admiration of his friends and colleagues and of his patients, whose welfare was ever his first consideration.

As a man and citizen he was upright and honorable; as a colleague and friend he was loyal and sincere.

Dr. Swanson is survived by his widow, Mae E. Swanson; four brothers, Dr. John A. Swanson of Saint Paul; and Goethfried, William J. and Hilding Swanson, all of Brainerd; and two sisters, Mrs. Hannah A. Elfgren of St. Cloud and Mrs. Mabel E. Jackson of Minneapolis.

Neil M. Watson

1865–1936

DR. Neil M. Watson, Red Lake Falls, Minnesota, was born at Williamstown, Glengarry County, Ontario, August 20, 1865, the son of Reverend and Mrs. Peter Monroe Watson. His death occurred April 6, 1936, at his home.

Dr. Watson received his M.D. degree from McGill University in 1891 and began practice at Red Lake Falls in 1892. Taking an active interest in local affairs, he served as mayor of the town for several years and on the school board for twenty-nine years, having been president of the board for twenty-six years. He was also president of the Red Lake county fair for a number of years.

Ever since coming to this country Dr. Watson had been a staunch Republican and attended several state and national conventions. In 1928 he was a Ninth District delegate at Cleveland when Coolidge was nominated, and again a delegate in 1932.

In January, 1918, Dr. Watson was appointed member of the State Board of Health, on which he served until 1933. He was also a member of the Red Lake-Pennington-Marshall tuberculosis sanatorium board. He had been city and county physician for a number of years and served on the county health board. He had also been local surgeon for the Northern Pacific railroad. For over twenty years he was vice president and director of the First State Bank of Red Lake Falls.

Dr. Watson was a member of the Crookston lodge of Elks, the Knights of Pythias and a life member of an Ontario Masonic lodge. He was a member of the Red River Valley Medical Society, Minnesota State and American Medical Association.

Dr. Watson never married. He is survived by a nephew, Dr. R. W. Watson, Highland Park, Michigan, and a cousin, Col. G. K. W. Watson, of Winnipeg.

The von Ruck Vaccine

The von Ruck Vaccine was first given publicity in 1912 by Dr. Karl von Ruck of Asheville, N. C., who was born in 1849 and was graduated in medicine in 1879. Dr. von Ruck died in 1922. In the period of 1912-1915, Dr. von Ruck received wide publicity for his alleged discovery of a "tuberculin," which, he asserted, would produce immunity from tuberculosis in both man and animals. Through political influence the United States Public Health Service was called on to investigate the von Ruck vaccine, and the newspapers published columns of laudatory matter on the subject. The sum and substance of the investigations made under government supervision were that immunity was not produced by the vaccine, but rather that the vaccine increased the susceptibility to tuberculosis. The newspapers gave practically no publicity to these unfavorable findings. Further political attempts were made to boost the vaccine, by printing at government expense as a Senate document, a mildly favorable article by two physicians. Time has obviously sustained the findings of the Public Health Service physicians, for, if the von Ruck vaccine possessed the virtues that were claimed for it, the scientific world would long since have adopted it. (J. A. M. A., December 7, 1935, p. 1935.)

Vitamin A and Urinary Lithiasis

Urinary calculi were known in remote antiquity and have been studied as to cause and treatment throughout many centuries. Most of the possible or likely etiologic factors have been given serious consideration and support by different investigators at various times. That some abnormality of diet, for example, excess of mineral elements, improper balance of its constituents, especially the inorganic elements, presence in it of some special stone-producing substance or other conditions affecting the diet might be the cause, has been considered for a long time. The idea, however, that a specific deficiency of the diet might be the cause is relatively recent and is the direct outcome of observations and experiments made on animals. In 1917, attention was drawn to the probability that a deficiency of a vitamin may be, at least indirectly, responsible for the formation of phosphatic urinary calculi in the rat. It was suggested that the calculi might be due, indirectly, to the effect of a deficiency of the fat-soluble group of vitamins. Although a number of investigations have been made in regard to the cause and treatment of urinary calculi, the Council on Pharmacy and Chemistry decided that the existing evidence does not warrant claims for the use of any of the vitamins, and particularly of vitamin A, in the prevention or treatment of urinary lithiasis and, further, that no such claims may appear in the advertising of accepted products. (J. A. M. A., December 14, 1935, p. 1983.)

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.
L. H. Rutledge, M. D.
W. F. Braasch, M. D., Chairman
J. C. Michael, M. D.
A. N. Collins, M. D.

Meeting the Area Men

Eight "area men," so-called, who represent the State Relief Administration throughout the state, met with officers, councilors and committeemen of the Minnesota State Medical Association in St. Paul recently.

The object was a better mutual understanding of practical problems involved in making arrangements for medical care of relief clients and the indigent generally.

Area men are in a position to influence county commissioners and welfare boards in their new organization for all phases of relief, including medical care.

The following remarks by Mr. L. P. Zimmerman, their chief and head of the State Relief Administration, are significant and encouraging.

Economy in the Long Run

They show, for one thing, that two years of experience with direct administration of medical relief have convinced fair-minded relief officials of the desirability of free choice of physician for the patient and of the preservation of the intimate relationship between patient and physician.

This same experience has convinced the state relief officials of the feasibility of medical care for the indigent on this basis and of its economy, in the long run, in the saving of both money and life.

Incidentally, Mr. Zimmerman's attitude as expressed here is in interesting contrast to the somewhat dubious and cautious state of mind of some of his predecessors in the early days of emergency relief in Minnesota.

"Thanks to the Depression"

Said Mr. Zimmerman:

"We have all had the satisfaction of seeing some good come out of this depression.

"For instance, we now know what it costs to provide medical care for the indigent. We know, also, what percentage of a whole budget for relief should be set aside for medical care.

"These figures will soon be available from our headquarters in St. Paul. They are based upon SERA experience when there was federal money to draw upon and they are therefore inclined to be liberal.

For a Satisfactory Plan

"I believe that we can work out a satisfactory plan for every county in the state, now, on the basis of these figures.

"As you know, the county commissioners, not the Relief Office, are in charge now. But I believe we can show them on the basis of statistics that the bill will greater in the end, not less, if medical care is not available at the time it is needed.

"That is an argument which I believe we can make the county commissioners see.

"They should be able to see, too, that the physician who knows the history of the patient and his family is much better able to care for the patient than a stranger.

"I believe, also, that county commissioners should see, as many of them do see, that it is not equitable for the medical profession to bear a larger share of the relief burden than other taxpayers.

Disease Prevention

"Our men could well talk disease prevention as they go about the state. Any publicity material you can give us to show the economics of treating disease early we shall be glad to distribute.

"We agree with you heartily in your dissatisfaction with the township plan of organization for handling relief.

"In fact, we are insisting now on a county organization in all the counties that are on the township plan for the purpose of handling relief emergencies.

"We are going to try to get legislation at the next session of the legislature to wipe out the township plan in Minnesota.

Unpaid SERA Bills

"One matter should be brought again to the attention of your members. Unpaid medical bills under SERA are not yet all in.

"If they are not in by June 1 the chances are that they will not be paid. Federal money that is now on deposit here for the purpose of winding up the affairs of the SERA will be withdrawn on that date,

and the Executive Council is quite likely to refuse to pay these old bills out of state and county funds."

Several "area men" spoke briefly to bear out what their chief said.

When "the Boss is Sold"

Mr. Andrew Taylor, assistant to Mr. Zimmerman:

"When the boss is sold, as Mr. Zimmerman is on your program for medical care, the underlings will follow. We will do our best to help you educate county commissioners."

Mr. A. V. Rohweder, chief advisor to the SERA Division of Safety and Compensation (Mr. Rohweder assisted in the fine organization of SERA Safety and Compensation work with its satisfactory provision for medical care for injured SERA workers' compensation, now terminated by WPA):

"I have always felt that the county physician plan for medical care of the indigent was not a good one. One man cannot possibly cover the work.

Half the Battle

"We have found in our work with employees of the United States Steel Corporation that the intimate personal relation between physician and patient aided by a complete case history is half the battle in the care of the sick."

Mr. Rohweder also asked that physicians be urged to send in outstanding bills for care of injured SERA workers. The SERA work program is now concluded and funds to pay outstanding bills under this program will not be available long.

SERA Reports

A résumé of SERA accomplishments and achievements published in the March *Memo* of the State Relief Administration included an interesting chapter on Health.

The figures herein contained are averages for the entire state. Figures for each county will soon be available, according to Mr. Zimmerman, for individual counties.

"One phase of the relief program," says the *Memo*, "has been the provision of medical, dental, and nursing care. Under the direction of nurses working from the state office and making visits in the field, there were 32 counties having nurses on their investigating staff. While these visitor-nurses carried active case loads, they also did extra work in the field of health.

"Although the figures on medical and other health care are not available for the calendar year, a survey made by the nurses on such care for the year from May 1, 1934, to May 1, 1935, reveals the follow-

President's Message

Encouraging

I want to ask you especially to read what Mr. L. P. Zimmerman, relief administrator for Minnesota, told a meeting of physicians and area relief men. It is printed on the opposite page.

Clearly medical men of Minnesota have the lines in their favor this time as they make the greatest effort in their history to solve the problem of medical care for the indigent.

With the sympathy and the intelligent understanding of these relief men and their chief, the education of county officials to a better appreciation of medical needs of their poor neighbors will be easier—provided always that the physicians themselves go about the business of negotiation with wisdom and understanding and fairness.

Difficult Job

Assuredly the county commissioners of Minnesota, with the entire responsibility for relief now returned to their shoulders, have a difficult job ahead of them.

They cannot pay out, in medical fees, money that is needed for food. Nor can they promise services that state appropriations and county tax funds will not cover.

The point for medical negotiators to remember and convey to these over-burdened officials is this: we are less interested in the fees to be collected, today, than we are in the establishment of a sound system which can be relied upon to provide proper care for the future.

Medical men in general will gladly adjust their own compensation for work done for the county poor to whatever sum can be set aside for that purpose, basing calculations upon the figures provided by Mr. Zimmerman.

Solemn Warning

And in this connection a solemn warning must, unfortunately, be issued to those physicians—and there are a few, even in Minnesota, even among our own members—who so far forget their responsibilities and obligations as to charge for unnecessary calls upon relief patients and otherwise pad their relief bills.

These men are injuring themselves and every one of their colleagues in Minnesota.

They are retarding a just settlement of the relief problem; they are holding up all medical men to obloquy and scorn; they are poisoning the minds of officials and laymen against a noble group of men, men whose first obligation is not to themselves or their bank accounts but to the men and women they are sworn to serve.

W. W. WILL, President,
Minnesota State Medical Association.

ing total figures which indicate to some extent the total scope of the work:

Home visits by doctors..45,084 (Maternity cases...4,275) (Prenatal cases....2,527)	Cost: Fees	$157,421
	Mileage	$ 58,503
Office calls.....67,112	Cost	$105,926
Nursing care by Graduate nurses..... 354 Practical nurses.....1,312	Cost	$36,928

"A few other items of corrective work may be mentioned such as tonsillectomies and eye corrections. Such corrective work was given to 3,835 children and 3,521 adults at a total cost of $86,185.

"Immunization was not attempted on any general scale by SERA since this was regarded as a local health responsibility, but in a few special cases immunization was done through the relief office.

"It is interesting to note that the clients receiving medical or dental care made their requests as follows:

"64 per cent were referred by the relief worker to the doctor.

"18 per cent were referred by the visitor to the doctor on the basis of findings brought to light on the home visit.

"18 per cent were referred by the doctor to the relief office for care.

"The counties spent approximately 4.5 per cent of their state and federal allocation for medical, dental, and other health care. The percentage varied from county to county according to particular needs. All but 19 counties spent less than 5 per cent of their state and federal money for medical care, while three counties having a particularly bad health situation went above 20 per cent of their total allocation.

"This medical, dental, and nursing program, although financed by state and federal funds largely, has permitted adequate health care to be given needy persons because of the excellent coöperation received by the relief office from practically every physician, dentist, and nurse taking part in the program. It is felt that the groundwork has been laid for a continuation under county auspices of a valuable service in the cause of better health and human happiness." (The italics are ours.)

Farmer Labor Platform

From the platform of the Farmer Labor party adopted at the convention at St. Paul March 28, 1936:

"We advocate the formation of consumers' coöperatives, credit unions, coöperative banking and service organizations, including coöperative enterprises for health, housing and rural electrification."

Several county organizations adopted more specific resolutions in favor of health insurance in advance of the state convention.

Many planks that appear in party platforms are quietly put up and taken down each year for many years before anyone makes a serious effort toward using them to erect anything permanent.

Such is likely to be the fate of this Farmer Labor gesture toward coöperative medicine.

It is a sign, however, and one which medical men should heed carefully. The trend is undoubtedly toward mass protection against all of the ills and hazards of life.

Sickness insurance will inevitably take its place with unemployment insurance and old age insurance as part of this protection unless medical organization shows a strength and resoluteness in opposition that will not be gainsaid.

The tide is carrying us towards medicine by bureaus and hirelings. Are American physicians content to drift with the tide?

Be Honest With Yourself

When you have finished your work today, sit down and study your methods. Go carefully over every step of each case, be honest with yourself and the patient, and then answer these questions:

1. Was I sincere in my examination? Did I give each case enough time and thought? Were the diagnoses and conclusions those of an honorable practitioner of the medical art?
2. Was I diplomatic in the handling of each case or was I argumentative and unreasonable? Did I use technical terms instead of less confusing English? Did I remember that to succeed one must be sensible with sensitive people? Did I remember, too, that the best policy is to be candid with each patient?
3. Was I tactful in advising the case, which had recently seen a competitor? Or was I inclined to be boastful and to make light of my associate's professional standing and work, thereby tending to break down the patient's confidence in all medical doctors?
4. Was I courteous in the face of disappointment or did I show my true feelings? Did I lose my temper or hold a friend by being polite?

The Medico-Legal Advisory Committee feels that a man cheats himself when he is unwilling to see his own weaknesses but profits most when he corrects those weaknesses. A singer corrects his faults by constant effort to improve his tone. A pole-vaulter improves by bettering his form. A salesman constantly studies his sales technic and approach and finds it is better to leave his customer with a smile than with a frown. Each medical man can be equally frank with himself and the best hope of improvement is a review of one's work at the close of the day.

It is certain that study and consequent correction of one's omissions means a collective less-

ening of the number of malpractice suits in Minnesota, as well as the payment of big *dividends of happiness* in work well done.

MEDICO-LEGAL ADVISORY COMMITTEE.

Physician's Riposte

Under the headline: "A Very Confining Regulation," the following note appeared in the April 15 *Memo* from the Social Service Division of State Relief Agency:

"County offices will recall that during the last five months of 1935 a change in the medical code prescribed that medical care must be given and the bill presented within five days after the date of authorization. Obviously this restriction was somewhat unpractical in certain situations.

"There has just come to our attention a physician's riposte to the awkward rule. The letter of the physician was as follows:

" 'As per your orders Mrs. —— was delivered within your five day period, in fact, on Sunday at 9 p. m.

'Medicine, as you know, is not an exact science, principally because of the variable reactions of human beings. However, Orders is Orders. I wish, though, that next time, if there is any, you would please give me about nine months notice—I'm better on a longer stretch.

Best regards,

'P. S. There is no doubt about this being a relief case (relief for Mrs. —— and myself).' "

Professional Jobless

A new study of the unemployed has just been made by the government.

Out of approximately six million relief cases studied, nearly one hundred thousand were found to be professional and technical workers.

"Believe it or not," says the *United States News,* commenting on the study, "the government found more than three thousand ministers and religious workers on its rolls. It discovered more than twenty thousand teachers and nearly one thousand lawyers along with over half a hundred physicians and surgeons."

A large group of the unemployed were found in the personal service and domestic fields. The number was set at six hundred thousand, about 10 per cent, which would be doubled if the American Federation of Labor's figures on unemployment are accepted and the total number of idle is above twelve millions.

Of the number covered in this census, twenty thousand were found to be hospital employees.

State Meeting

The 83rd annual sessions of the Council and the House of Delegates were about to convene as this issue went to press.

Many grave problems confront physicians these days. They must settle definitely upon policies that may alter the whole course of medical practice in the United States.

Relief, the Social Security program, the proposed new welfare legislation all involve the medical profession as an integral part of their operating personnel.

A large part of this new social machinery will be directed by lay boards and administrators and medical men must constantly be on their guard lest medical care be hampered and misdirected through lay ignorance of medical problems. They must be on guard, also, lest these programs actually encroach upon and destroy the independent practice of medicine.

Medicine in America still believes that its future lies in the preservation of the individual initiative and responsibility of its practitioners.

Complete reports of the proceedings of these important Rochester sessions will be reviewed in these columns next month. Read them!

Brisk Sale

Two Minnesota State Medical Association publications continue to have a brisk sale.

The Handbook on the Debate question printed this year for the assistance of high school debaters has been noted widely in medical publications all over the country. The Diabetes booklet published under the auspices of the Committee on Diabetes in 1933 has already sold about 5,500 copies and orders are still coming in regularly.

Minnesota State Board of Medical Examiners

Albert Lea Woman Sentenced to One Year Term at Shakopee

State of Minnesota vs. Mrs. Frances Stauch.

On April 13, 1936, Mrs. Frances Stauch, forty-five years of age, of Albert Lea, Minnesota, entered a plea of guilty before the Honorable Kenneth G. Brill, Judge of the District Court of Ramsey County, Minnesota, to an information charging her with the crime of abortion. Judge Brill passed the case for sentence until April 21, 1936, to permit an investigation in reference to the past record of the defendant. On April 21, 1936, Judge Brill imposed a sentence of one year at hard labor at the Woman's Reformatory at Shakopee, Minn.

Mrs. Stauch, who has lived in Albert Lea for the past twenty-five years, came to Saint Paul on January 31, 1936, for the purpose of performing an abortion on a twenty-two year old Saint Paul girl, for which she was paid the sum of $24.00 and a round trip bus ticket from Albert Lea to Saint Paul. Mrs. Stauch has no medical education except such as she acquired as a practical nurse on a few occasions in Albert Lea. She used a piece of elm bark which she had sharpened to a point and which resulted in a perforated bowel for the girl. The girl has been in a hospital from

February 9, 1936, to the present time. Mrs. Stauch stated to the Court that this was the only abortion she had ever performed on anyone except herself. The Court stated, however, that he was of the opinion that the defendant was an old offender and that the risking of the lives of girls at the hands of these quacks would have to stop; that she was being sentenced to Shakopee not only as a punishment to her, but as a warning to others.

Waseca Osteopath Pleads Guilty to Practicing Medicine Without a License

State of Minnesota vs. Wayne A. Hockett, D.O.

Wayne A. Hockett, twenty-five years of age, who holds a license to practice osteopathy in the State of Minnesota, entered a plea of guilty on April 20, 1936, at Owatonna, Minnesota, before the Honorable Fred W. Senn, Judge of the District Court, to an information charging him with practicing medicine without a license.

Hockett, who has practiced nearly two years at Waseca, Minnesota, was arrested on April 3, 1936, following an investigation conducted by the Minnesota State Board of Medical Examiners. This investigation disclosed that between March 2, 1936, and March 21, 1936, Hockett had written two prescriptions for medicine to be taken internally by one Max Schoenfeldt, who was suffering from cancer of the pancreas with metastasis of the liver. Hockett also gave Mr. Schoenfeldt two injections in the arm of a so-called cancer serum. For this, Hockett obtained the sum of $150.00 cash in advance. A third injection was to be given (the agreed price being $50.00 cash per injection), but, due to the severe illness of Mr. Schoenfeldt, was never administered. Mr. Schoenfeldt died on March 26, 1936. Following a complaint by a brother of Mrs. Schoenfeldt, Hockett returned $100.00 of the fee. On the same day that Mr. Schoenfeldt died, Hockett went to his attorney and had a release prepared, which was signed by the widow, relieving Hockett of any liability for malpractice arising from the treatment and death of Mr. Schoenfeldt. The release specifically set forth that Mr. Schoenfeldt was treated for cancer by Hockett. The release also provided that the widow was to return to Hockett the balance of the capsules and pills then in the possession of the widow. When Hockett was interviewed by Mr. Brist, representing the Minnesota State Board of Medical Examiners, he stated that he did not know the name nor the ingredients of the serum that he had injected in the arm of Mr. Schoenfeldt.

Following the presentation of the facts, Judge Senn sentenced the defendant to pay a fine of $250.00 or serve 120 days in the Waseca county jail. This sentence was suspended pending the good behavior of Hockett and on condition that he refrain from violating the Medical Practice Act in any manner in the future.

This is the first time in eight years that an osteopath has been arrested in Minnesota for practicing medicine without a license. In the past it has been the policy of the Medical Board either to take these cases up with the individual concerned or the Osteopathic Board. The Medical Board, however, feels that the osteopaths have had sufficient opportunity to acquaint themselves with the law which specifically forbids an osteopath to give or prescribe medicine for internal use. The Medical Board does not wish to institute a campaign against the osteopaths, but it shall insist that the osteopaths confine their practice to osteopathy and refrain from practicing medicine.

The Medical Board wishes to acknowledge the fine spirit of coöperation displayed in the case by Mr. John H. McLoone, County Attorney of Waseca County. The defendant was represented in the District Court by F. G. Sasse, attorney at Austin, Minnesota.

OF GENERAL INTEREST

Dr. Howard K. Gray of Rochester was recently elected president of the Rochester Community Chest.

* * *

Dr. William J. Eklund, Duluth, has filed as a candidate for state representative from the 57th district.

* * *

Dr. W. T. Greenfield has recently taken over the practice of the late Dr. V. P. Johnson at Delano, Minnesota.

* * *

Dr. W. F. C. Heise of Winona, who recently was injured in an automobile accident, is recovering nicely from his injuries.

* * *

Dr. John J. Ederer, who has been practicing at Cass Lake, is now associated in practice with Dr. W. G. Tanglin at Mahnomen.

* * *

Dr. and Mrs. Charles Stafford recently moved from Dent, Minnesota, to Hewitt, Minnesota, where Dr. Stafford has established a practice.

* * *

Dr. Edward Bratrud of Thief River Falls, Minnesota, recently returned from a six weeks' motor trip to Florida and through the southern states.

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Dr. E. G. Olmanson, who has been practicing at Hanska, Minnesota, for the past two years, is now located in St. Peter, where he has established a practice.

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Dr. J. F. Lynn, health officer of the city of Waseca for the past thirty-five years, retired from office last month. He will be succeeded in office by Dr. S. C. G. Oeljen.

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Dr. J. S. Emond, a graduate of the University of Minnesota, College of Medicine, 1932, has moved to Farmington, Minnesota, where he will practice medicine and surgery.

* * *

Dr. O. F. Mellby, Thief River Falls, was elected president of the local Rotary Club at the annual meeting held in April. Dr. Mellby succeeds Dr. Edward Bratrud in this office.

* * *

Dr. William C. Carroll of Saint Paul has purchased a new home on the west shore of Lake Josephine, near Saint Paul. The residence is the former home of State Senator Joseph M. Hackney.

* * *

Dr. O. S. Wyatt of Minneapolis was elected president of Abbott Hospital staff at the annual meeting in April. Dr. K. A. Phelps was elected vice president, and Dr. A. E. Cardle, secretary.

Dr. Wade R. Humphrey of Stillwater has recovered sufficiently from his recent accident to attend to his office practice. Dr. Humphrey was recently elected president of the Stillwater Golf Club.

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Dr. Hjalmer Mortensbak, a graduate of the University of Minnesota, College of Medicine, has completed his internship at the Minneapolis General Hospital and will locate at Hanska, Minnesota, this month.

* * *

Dr. C. N. Harris, health officer of Hibbing, headed a committee from the local Chamber of Commerce which collected the material to establish Hibbing's right as the healthiest city of 20,000 and under in the nation.

* * *

Dr. Myron O. Henry of Minneapolis was the guest speaker at the meeting of the Nebraska State Medical Society held at Lincoln, Nebraska, April 9. The subject of his talk was "Treatment of Fractures of the Spine."

* * *

Dr. Owen H. Wangensteen, head of the surgery department of the University of Minnesota, College of Medicine, was recently awarded the Samuel D. Gross prize in Surgery, for researches and discoveries relating to the treatment of intestinal obstruction.

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Dr. Lee M. Eaton of Rochester, Minnesota, and Miss Mary Louise Long of Moline, Illinois, were united in marriage Thursday, April 2, 1936, in Moline. Dr. and Mrs. Eaton are now at home in Rochester, where Dr. Eaton is neurologist on The Mayo Clinic staff.

* * *

Dr. Thomas Lowry, son of Mrs. Horace Lowry of Minneapolis, and his fiancee, Dr. Elizabeth Chittenden, of New York and East River, Connecticut, have chosen July 3 as the date of their marriage, which will take place in East River, Connecticut. Both Dr. Lowry and Dr. Chittenden are serving internships at present.

* * *

The American Association for the Study and Control of Rheumatic Diseases is holding its fifth conference on rheumatic diseases at the Phillips Hotel, Kansas City, at nine o'clock Monday, May 11, 1936. The program will consist of an educational program on the differential diagnosis of diseases of the joints.

* * *

Dr. A. O. Swenson of Duluth was elected chief-of-staff at the annual meeting of the Miller Memorial Hospital, Duluth. Others elected to the staff are: Dr. Paul G. Boman, vice chief-of-staff; Dr. Ralph Eckman, secretary, and Dr. M. McC. Fischer and Dr. C. H. Schroeder, executive officers.

* * *

Dr. Baxter Smith, son of Dr. and Mrs. B. A. Smith of Crosby, Minnesota, has entered the General Hospital in Cincinnati, Ohio, to serve his internship, following his recent graduation from the University of Minnesota College of Medcine. He was one of the first nine to receive the A. O. A. honorary degree at the University this spring.

* * *

Dr. Kenneth F. Maxcy, professor of preventive medicine and bacteriology at the University of Virginia, has been appointed by the Board of Regents of the University of Minnesota as professor and head of the department of preventive medicine and public health. Dr. Maxcy takes the position formerly held by Dr. Harold S. Diehl, now dean of medical sciences. A graduate of George Washington University in 1911, Dr. Maxcy has been associated with the University of Virginia medical school since 1929.

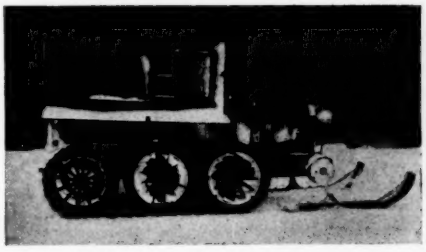
* * *

That Minnesota physicians are interested in local and county government is evidenced by recent elections, among which are the followig: Dr. B. C. Ford, Marshall—Mayor; Dr. H. A. Fasbender, Hastings—Mayor; Dr. E. G. Nethercott, Pine City—chairman of Pine County Republican Committee; Dr. R. C. Radabaugh, Hastings—chairman of Dakota County Republican Committee. Dr. M. M. Hursh of Grand Rapids has filed for re-election as county commissioner from the second district.

* * *

Dr. C. W. More of Eveleth has been appointed on the advisory committee of physicians to assist in formulating policies in solving problems of hospitals operated by the St. Louis County Poor Commission. Dr. B. S. Adams of Hibbing is chairman of the Commission. Other members of the advisory committee are: Dr. C. W. Parker, Ely, and Dr. C. W. Bray, Biwabik (for the Buhl hospital); Dr. J. R. Manley, Dr. E. W. Hatch and Dr. A. W. Coventry, Duluth (for the Hearding hospital). This is the first time in history, it is stated, that such a step has been taken by the Poor Commission.

* * *



The accompanying photograph is that of an assembled tractor made by Elihu Highland, a mail carrier of Bricelyn, Minnesota, and commandeered on a certain occasion last winter by his fellow townsman, Dr. W. H. Sybilrud, to make a much needed professional call in subzero weather over drifted roads. The twenty-two mile round trip took some nine hours, and even this snowbird balked, the final mile having to be covered with a team and sled. City practitioners sometimes are forgetful of their blessings in the way of cleared streets and short distances.

TRANSACTIONS *of the* MINNEAPOLIS SURGICAL SOCIETY

Meeting of January 9, 1936

The President, Dr. F. A. Olson, in the Chair

THE regular monthly meeting of the Minneapolis Surgical Society was held in the lounge of the Hennepin County Medical Society rooms on January 9, 1936. The meeting was called to order by the President, Dr. F. A. Olson, at 8:00 p. m. There were forty members present.

The following scientific program was presented by members on the University staff:

REPORT ON BRAIN TUMOR OPERATIONS DONE AT THE UNIVERSITY HOSPITAL DURING THE YEAR 1935

William T. Peyton, M.D.

Abstract

A report was made on the cases of brain tumor examined at the University Hospital during the year 1935. There were fifty-four cases in which a diagnosis of brain tumor or probable brain tumor was made. In twenty-nine of these, the presence of a tumor was verified either by operation or biopsy. Twenty-four patients were operated upon for the purpose of removal of the tumor. Hospital and operative mortality was discussed and problems in diagnosis and treatment of certain types of tumor were illustrated by a discussion of individual cases in this series.

HIGH GASTRIC RESECTION IN CANCER OF THE STOMACH WITH RELATION OF PERSONAL EXPERIENCES

Owen W. Wangensteen, M.D.

Abstract

It is more than fifty years since Billroth did the first successful gastric resection for cancer of the stomach. In the intervening years, better diagnostic methods (the x-rays) and improved surgical technic, as Billroth foresaw, have improved the results of operation. Yet a spirit of extreme pessimism, in the main, dominates the picture of gastric cancer. To be sure, no one who has had a large experience in the treatment of cancer can escape the impression that, apart from cancers of the skin, the late results reckoned numerically, on the whole, are poor. Yet, palliation where cure can not be achieved is a well recognized principle of medical and surgical therapy. Any one who reads the surgical literature of cancer of the stomach of the last ten or fifteen years can not fail to see that the results of operative treatment of this disorder have definitely improved. This improvement has come about through earlier diagnosis and better operative technic.

In dyspepsias, a diagnosis must be *demanded* rather than symptomatic relief of distress by adjustments in the diet and the administration of alkaline powders. The manner in which cancer of the stomach is to be recognized earliest after the appearance of symptoms is through the employment of x-ray examination of the stomach in the hands of expert roentgenologists. The rate of growth of the malignancy influences the outlook just as much or more than does the earliest possible clinical recognition of the malignancy. There is assuredly, *acute and chronic cancer* as there is *acute and chronic infection*. Prolonged symptoms do not necessarily indicate that the lesion is an ulcer. The best results in the operative treatment of cancer of the stomach, on the whole, are attained in that group where the patient has had symptoms for a considerable length of time (one to two years or more) and at operation a resectable lesion is found. The patient with a tumor which has become as large as a baby's head in three months is not likely to have as good an outlook after resection as the patient whose tumor is small, though his story is longer.

Cases of gastric resection done for malignancy in the preceding thirty months were reported. These were thirteen in number. All but two were extensive operative removals in which it was necessary to do subtotal resections; one patient died—a mortality of 7.6 per cent. The repeated instillation of one-tenth normal hydrochloric acid into the stomach before operation through an inlying duodenal tube and the employment of suction after operation were stressed. Inhalation anesthesia (ethylene and ether) is employed regularly, a left rectus incision, and a posterior Polya type of anastomosis. In the operative procedure, because of the microbic character of the fasting stomach and upper reaches of the intestinal canal in the presence of gastric cancer, great care should be observed to avoid contamination. All mucous surfaces are gently swabbed with 1 per cent sodium ricinoleate (soap solution) to reduce the hazard of infection.

REPORT OF THE FOURTEENTH ANNUAL CONGRESS OF ANESTHETISTS

Ralph T. Knight, M.D.

The Fourteenth Annual Congress of Anesthetists was held at Atlantic City, June 10-14, 1935, at the time of the joint meeting of the American and Canadian Medical Associations. Two half-day sessions were held jointly with sections of those associations, one a general session on anesthesia in the Section on Miscellaneous Topics, and the other a session on Obstetrical Anesthesia in the Section on Obstetrics, Gynecology, and Abdominal Surgery. In addition, the Anesthesia Congress held six half-day sessions of its own.

There were a number of foreign anesthetists who participated in the programs, among them Sir Francis Shipway, K.C.V.O., M.D., Anesthetist to the King, Guy's Hospital and Medical School, London; Noel A. Gillespie, D.M., B.Ch., M.A., Anesthetist to the London Hospital; and Gilbert R. Troup, M.B., B.S., M.R.C.P., Anesthetist to Perth Hospital, Perth, Western Australia.

Under *Anesthesia Teaching and Service* Dr. Thomas J. Collier of Atlanta, Georgia, President of the Associated Anesthetists of United States and Canada, called attention to the very small amount of instruction in anesthesia given in most Class A medical schools and even in most internships. Thus the great bulk of the graduates go out with no knowledge or skill in giving a safe or serviceable anesthesia. He called attention to the recent requirements of the American College of Surgeons and the American Medical Association regarding anesthesia supervision in accepted hospitals, and he pled for more effective teaching of anesthesia.

Dr. Henry S. Ruth of Philadelphia, Chief of Anesthesia at the Philadelphia General Hospital and President of the Eastern Society of Anesthetists, called attention to the fact that after the original advent of ether, chloroform, and nitrous oxide in the 1840's, anesthesia as a science and art remained practically static until the last few years, so that it became relegated to technicians as a routine procedure. Like obstetrics, which had remained so relegated for thousands of years and sprang into life and professional interest when newer knowledge arrived, so anesthesia is experiencing a renaissance and is offering surgery new and more comprehensive help, but special knowledge, experience, and skill is required, just as in other special fields. He urged that more physicians adequately prepare themselves for this service so that surgeons, finding the service available, will come to know its worth and embrace it as a further help in adding to their good results.

Dr. Arthur M. Wright, Professor of Surgery, New York University Medical College, spoke on "Teaching and Anesthesia Service from the Viewpoint of Surgery." He said, "Although anesthesia made the development of modern surgery possible, modern surgery has made the development of anesthesia a necessity. Anesthesia that offers only pain relief and muscle relaxation is not adequate today. The urgent demand is for an anesthesia which will at least not militate against the patient's convalescence and recovery. Unfortunately, no such security is generally offered. Much of the delay in post-operative recovery is post-anesthetic delay, and some post-operative mortality may be due to the anesthetic." He bemoaned the fact that now, nearly one hundred years after the discovery of ether anesthesia, the routine procedure in most hospitals in the United States is ether by the original method. He described the recent development of a profssional anesthesia staff at Bellevue under Dr. E. A. Rovenstine, and contrasted the consultation value and the special knowledge and skill available with the situation under former conditions.

Experimental Investigation.—Dr. Ivan B. Taylor, instructor in anesthesia, University of Wisconsin, gave an interesting paper on leukocytosis following inhalation anesthesia.

Drs. Chester M. Kurtz, J. H. Bennett, and H. H. Shapiro, Division of Medicine, University of Wisconsin, presented "Studies on Electrocardiographic Changes under Surgical Anesthesia." They found that these changes occur in a great majority of cases with all anesthetics.

Dr. Frank Wang CoTui, Associate Professor of Experimental Surgery, New York University Medical College, showed by animal experiments the effects of posture, carbon dioxide, epinephrin, and ephedrin upon blood pressure and respiration under spinal anesthesia, justifying our clinical use of these agents.

Newer Anesthetics and Methods.—Sir Francis Shipway of London gave "Further Observations on Avertin Anesthesia." He advocated its more frequent use, especially for thyroid operations, and called attention to the fact that with skillful judgment of the patient's susceptibility or resistance to anesthesia the dose may be varied to give almost uniform results with all patients.

Dr. Paul M. Wood, Instructor in Anesthesia, Columbia, discussed the combined use and advantages of avertin and cyclopropane.

Dr. Harrold R. Griffith of Montreal presented further researches, experiences and results with cyclopropane anesthesia. He reported 1,108 administrations for all types of surgery, including 592 abdominal sections, 90 per cent of which were without the addition of any ether. Satisfactory relaxation was always procured. In 371 cases he preceded the cyclopropane with avertin. He states, "I believe the combination of avertin with cyclopropane forms the nearest approach we have yet made to the 'ideal anesthetic' . . . I feel that on the whole avertin is safer and more controllable than any of the barbiturates. Patients who have had avertin and cyclopropane for abdominal operations have had less postoperative discomfort than any previous series of patients in my experience. Certainly there has been less vomiting and less distention than in the patients to whom I formerly gave avertin, ethylene, and ether. . . . I do not give morphine when avertin is to be used." He gave cyclopropane 267 times through an endotracheal tube for head, neck, chest, and upper abdominal operations, especially in fat necked people. He found the tube a great help in obtaining quiet controllable breathing. He says the tube should not be used unless really needed for it tends to cause post-operative tickling and cough.

Dr. E. A. Rovenstine, Assistant Professor of Surgery in charge of anesthesia, New York University Medical School, and anesthetist in charge, Bellevue Hospital, spoke on "Cyclopropane Anesthesia in Thoracic Surgery," the advantages being lack of lung irritation, reduced respiratory minute volume, and adequate oxygenation, the only disadvantage being inflammability, which precludes the use of the endotherm knife, and the need for very accurate and understanding administration.

All who presented papers or entered discussion on cyclopropane were enthusiastic about it and had only

minor imperfections to mention, if any. All experience seems to be as favorable as our comparatively small experience with it here at Minnesota.

Dr. Pol N. Caryllos, Professor of Clinical Surgery, Cornell University Medical College, presented "Evipal Intravenous Anesthesia in Thoracic Surgery." He felt it exhibited certain advantages over inhalation anesthesia, especially in obtaining quiet breathing.

It might be interesting in this connection to relate a recent experience of ours. The patient, a robust man in his late thirties, had an acute and practically complete respiratory obstruction. The x-ray diagnosis was an intrathoracic tumor displacing the trachea far to the left and compressing it. The immediate acute symptoms came on during the taking of an esophagogram and the patient, very cyanotic, was rushed to the operating room. Evipal anesthesia was given and breathing at once became much less obstructed. A tracheotomy catheter was inserted past the obstruction and the patient returned to bed at ease and awake within a few minutes. An hour later it was decided that more comprehensive relief should be given without delay. Evipal intravenous anesthesia was again given and maintained for 50 minutes with fractional doses. The respiration then needed more positive control. Sterile draped respiratory tubes were hooked up to the tracheotomy tube and anesthesia was continued with cyclopropane and oxygen. The patient remained in excellent color and condition and was returned so to bed.

Dr. Frank W. Marvin, Assistant Professor of Anesthesia, Tufts College Medical School, and visiting anesthetist, Boston City Hospital, spoke on the clinical use of Vinethine (di-vinyl-oxide). It is nearly twice as potent as chloroform and four times as potent as ethyl ether but has a wide margin of safety. It is especially useful for short operations, even in the office, but he reported its generous use also for all types of surgery, with satisfaction. It is used on the open mask or added to the gases. He believes it has a great future.

Pre-anesthetic Medication.—Dr. Albert H. Miller, Providence, R. I., one of the deans in anesthesia, called attention again to the value of paraldehyde. Four to eight drachms given rectally in two ounces of mineral oil one hour before operation allays all apprehension and brings drowsiness or sleep from which the patient may be easily aroused to lapse again when quiet. The usual atropine is given but no morphine. It reduces clotting and bleeding time to about 90 seconds.

Katzman of Washington advocated its rectal administration with 1.5 c.c. of benzyl alcohol as a local rectal sedative, the whole washed in with saline instead of oil.

B. C. Leech, Director of Anesthesia, Regina General Hospital, reported pre-anesthetic medication in 500 children, and came to the conclusion that small doses of morphine and hyoscine are after all much safer and more uniform than barbiturates. He gave a scale of dosage ranging from 1/40 to 1/600 gr. at age one to 1/12 and 1/300 gr. at age twelve. From six months to one year he gives only hyoscine gr. 1/900.

Hans Molitor, Rahway, N. J., reported researches on bulbocapnine.

Anesthesia for Obstetrics.—There was a symposium of six papers on obstetrical anesthesia, ranging through parasacral, pudendal, and local, spinal, barbiturates with rectal ether-oil, vinethene, cyclopropane, and a résumé of ether, chloroform, nitrous oxide and ethylene. The paper which probably attracted the most interest was the one by Dr. Gwathmey of New York and Dr. C. O. McCormick, Associate Professor of Obstetrics and Gynecology, University of Indiana Medical School. Their principle is to give 3 grains of pentobarbital sodium followed by 1½ grain doses as soon and as often as the patient wants it (not over 12 grains to be given) then 1/6 or 1/4 of morphine with about the second or third dose, but no morphine if delivery is expected within four hours. When the morphine begins to wear off, a mixture is injected into the rectum consisting of 20 grains quinine, 45 minims alcohol, 2 drachms paraldehyde, 2½ ounces ether, liquid petrolatum to make 4 ounces. The injection is repeated at the patient's desire at intervals of two and a half hours or longer. Nitrous oxide or ethylene or cyclopropane is given at the actual delivery. The effort is to cover the pain during the entire period of labor.

Therapeutic Nerve Block.—Interesting papers were given by Everett A. Tyler, Professor of Anesthesia, Hahnemann Medical School and Hospital, Philadelphia, and Elias L. Stern, Instructor in Anatomy, Columbia University School of Medicine, on the treatment of intractable pain, covering nerve blocking including the intraspinal injection of small quantities of alcohol.

Gas Therapy.—Disappointment was expressed by many in the long-time results in the prevention of postoperative pneumonia by hyperventilation with carbon dioxide and oxygen.

The simpler administration of oxygen by oro-pharyngeal insufflation was again presented by K. E. Lemmer, Ivan B. Taylor, and E. A. Rovenstine of the University of Wisconsin, as an aid to postoperative recovery, especially in pneumonia.

Dr. Alvan Barach, Associate in Medicine, Columbia University College of Physicians and Surgeons, presented the use of helium and oxygen as an aid in certain lung conditions, notably asthma, the principle being that helium, much lighter than nitrogen, is much more diffusable.

Following the scientific program a short executive meeting was held. The meeting was adjourned at 10:00 p. m.

E. A. Regnier, M.D.
Secretary

PROCEEDINGS *of the* MINNESOTA ACADEMY OF MEDICINE

Meeting of March 11, 1936

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, March 11, 1936. The meeting was called to order by the President, Dr. Thomas S. Roberts, at 8 o'clock.

There were thirty-nine members and one guest present.

Minutes of the February meeting were read and approved.

Upon ballot, Dr. E. M. DeBerry was elected a candidate for University membership in the Academy.

The scientific program followed.

ANCIENT AND MODERN KNOWLEDGE CONCERNING ANAL FISTULA

LOUIS A. BUIE, M.D.

Rochester

Dr. Buie read his Inaugural Thesis on the above subject. Lantern slides were shown.

Abstract

Although discussions of anorectal disease appear in the earliest records of medical history, confusion still exists concerning the cause and management of anal fistula.

The position in which those who are unfortunate enough to have ischiorectal abscesses and anal fistulæ find themselves today is not unlike that of those who were similarly afflicted centuries ago. Rarely are patients seen nowadays who have not been put through several "preliminary" operations before a cure is established, part of the confusion being attributable to a faulty conception of the origin and course of the disease and part to an improper terminology; the terms "rectal" and "anal" as applied to fistula being used interchangeably.

An anal fistula always originates as an infection in the anal crypts and extends outward, where it ultimately involves the ischiorectal space. Here, either rupture or surgical incision establishes the secondary opening on the surface of the body or within an adjacent viscus.

The crypts of Morgagni are of most concern in discussion of anal fistulæ. These crypts and the adjacent papillæ are susceptible to trauma during the daily bowel movement, and infecting organisms may be admitted. As a result of this invasion inflammatory changes involve the crypt and a focal point develops or a papilla may become enlarged with edema and seal itself over the crypt, thus forming a microscopic abscess. With the formation of these microscopic abscesses the first stage in the development of anal fistula has been passed. The second stage is the process of burrowing, and the infection may extend (a) subcutaneously and superficial to the anal muscles, (b) through the muscular structures themselves, (c) between the internal and external sphincter muscles, or (d) upward beneath the mucosa of the rectum without first passing into the ischiorectal tissues. The third stage consists in the development of the ischiorectal abscess. With rupture or incision, the fourth stage is established and the anal fistula is complete; from this description it being apparent there can be no such thing as a blind internal or blind external anal fistula.

Treatment of this disease is surgical and embodies two chief factors: (1) conversion of all fistulous tunnels into open ditches with all margins dissected away in such a manner as to prevent accumulation of infectious intestinal discharges within the recesses of the wound; (2) avoiding the time-worn practice of packing wounds.

Discussion

DR. H. E. HULLSIEK (St. Paul): I should like to express my very keen appreciation of Dr. Buie's presentation and beautiful illustrations. It is always interesting for me to disagree with some of the things a speaker has said, but, in this case, Dr. Buie's views are so in accord with mine that I shall have to be content with a violent agreement with his principles. I especially like his attempt to clear up fallacies and misnomers in connection with terminology. I have always thought that these conditions should be called sinuses instead of fistulæ. As I remember, a fistula is a channel uniting a hollow viscus with the external surface of the body or another viscus. Textbooks are still full of such terms as incomplete or blind fistula. The term fistula implies, as Dr. Buie says, a primary and secondary opening. I have also given up the use of methylene blue and Beck's paste as a means of determining the course of the tract. I do occasionally make use of probes, but the ones I use are of soft German silver wire and so flexible that one is unable to cause trauma or establish a false tract. I should like to ask Dr. Buie one question. Why must the tract be explored with the incision beginning at the primary opening? It has always been my practice to do it from the secondary or external opening, principally because the external opening is always obvious. It is certainly true that a fistulous tract is easy to follow without the use of dye or paste. The question of packing, I feel, is very important, and it is my practice to remove the packing at the end of forty-eight hours and not repack the wound at any subsequent time. If sufficient skin edge is removed so we have flat, saucer-shaped wounds, they cannot close over externally, but must heal from the bottom and do so without the thickened scar-tissue wall which results from continued packing.

DR. J. A. JOHNSON (Minneapolis): Dr. Buie has certainly given us a careful analysis of rectal fistulæ.

I particularly appreciate his discussion of it from both the embryological and anatomical standpoint.

For many years I have found a prevalent notion among the profession that a large percentage of rectal fistulæ are of tuberculous origin. No doubt the opinion has been handed down for a long time and probably arose from the fact that these sinuses remain open for many years until operated. Of course, if one is doing surgery in a tuberculosis sanatorium, he will no doubt find many resulting from this disease. It has, however, been my experience that very few of the "general run" of fistulæ are tuberculous; and, when they are, one is quite certain to find tuberculosis in other parts of the body.

I would like to ask Dr. Buie what percentage of cases that he comes in contact with are tuberculous, and if it is not usual to find in these cases tuberculosis in other parts of the body?

Dr. Arnold Schwyzer (St. Paul): I join the other two gentlemen in thanking Dr. Buie for this splendid demonstration. I had always felt in my cases that Morgagni pockets were the origin of the fistula and I am glad to know that some one who sees a great many of these cases feels so too. Prof. Tavel, of Berne, published an article in one of the leading journals over there, in which he tried to give another origin for these fistulæ. The glands in the lower rectum become larger and have a more acinous character. He showed that these glands become in places quite long and penetrate deeply even through the internal sphincter to form clusters on the outer side. Tavel thought an infection in these glands would lead to these fistulæ, especially in the ischiorectal space. For that reason it was very valuable to me to hear some one of unusually large practical experience say that we don't need to hunt so far away for the origin, but to look closely at the Morgagni ridge. There was also something said about packing and, of course, much packing is wrong and an awful nuisance. I have hardly ever done more than put in a little strip. Recently I read in a Swiss medical journal an article by some one who showed that if you have a poorly granulating wound you get a wonderful effect by using cod liver oil locally. I could observe a surprisingly good effect after operation.

Dr. O. H. Wangensteen (Minneapolis): I hesitate very much to prolong this discussion. It is evident, however, that Dr. Buie's presentation struck a sympathetic note amongst the surgeons. As I listened, it sounded like a talk on the principles of wound surgery —a concept which is well worth keeping in mind in every type of surgery. John B. Murphy used to say that, if the external sphincter were divided in more than one place at a time, incontinence would follow. Dr. Buie, I believe, is authority for the statement that, if need be, the external sphincter may be simultaneously divided at more than one place with impunity. I should like to hear him discuss this point.

We see at the University occasionally very complicated cases of infection about the rectum. Some of these have had colostomies with complete deviation of the fecal stream and yet suppuration continues. Some of these I am inclined to believe are instances of so-called lymphogranuloma inguinale. It is difficult to conceive of a case, which originated as a simple cryptitis or folliculitis, continue to suppurate after opening of the abscess and total diversion of the feces. In September, 1928, I saw with Dr. Michelson such a case. She also had a midline sternal ulcer. I gave her potassium iodide and the sternal ulcer healed and the rectal condition improved considerably. At the time I was inclined to believe that the rectal condition was a gumma (J.A.M.A., 1929, 93:1380-1382). Since becoming familiar with the picture of lymphogranuloma inguinale, I rather suspect that was the nature of the lesion present. Since then, I have seen additional cases. The Frei test in my own experience may be negative. Such cases are rarely identified and I have the impression that potassium iodide is as good a drug as any in their treatment. Early in their course a suppurative granulomatous condition is present; late, a stricture. Except for surgical relief directed at narrowing of the lumen, it would not appear that surgery is of any avail. Usually, however, when these cases come under observation extensive surgery has frequently already been done. I should like to ask Dr. Buie what his experience has been with cases of this sort.

Dr. Buie (in closing): Among ethical practitioners of medicine the operation of "splitting" the anal crypts is rarely used. In certain conditions, when the anus is badly infected or when there is inflammatory involvement or ulceration of the crypts, it is sometimes advisable to dissect away the tissues overlying the crypts in order to facilitate drainage of the infective intestinal excretions through the rectal outlet. When followed by proper local treatment this operation has value; however, the method has been used indiscriminately and should be condemned on that account.

I do not believe that the probe should be used in examining anal fistulæ unless the utmost care is exercised. Whenever possible, the fistulous tract should be examined from the primary source toward the secondary opening, and on that account it is usually necessary for the tissue to be anesthetized. Only minor investigations should be carried out in the absence of anesthesia.

Tuberculosis is always an interesting topic when anal fistulæ are discussed. Few patients who have anal fistulæ are tuberculous, and, therefore, one need have little concern over the connection between tuberculous and fistulous processes. When tuberculosis is present, it should be dealt with independently of the fistula and the fistula should be eradicated unless the tuberculous process is so serious that operation cannot be performed.

On microscopic examination of the normal anal wall one finds glandular structures. These may be called "anal ducts" and they bear a certain relationship to anal crypts. In most instances they are indeterminate connections.

Vaseline gauze should be used in dressing anal rectal wounds and vaseline may also be incorporated in an iodoform gauze dressing. Ano-rectal wounds are painful at the epidermal margins and, when vaseline is incorporated in the dressing, it relieves the patient of a great deal of discomfort.

Fistulæ cannot be cured unless those tissues which are external to the tract are cut, and if it happens that there is muscle between the fistulous tract and the exterior, the muscles must be included in the excision. Those fistulæ which are associated with lymphogranuloma inguinale are usually most serious, and often in such cases it may not be possible to heal the fistulous tract. These, of course, are not anal fistulas in the strictest sense; they originate from the deformed and infected rectal wall and their course is irregular. Many times they may be rectovaginal, rectoperineal or rectovesical, and so forth. Usually an infected mass is present, consisting of scarred bowel and lymphoid tissue. The problem of treatment is the same as that which has to do with the cure of many of the more serious forms of benign rectal strictures, and often it cannot be solved with any degree of satisfaction. Colostomy with or without posterior resection often has to be considered.

MULTIPLE MYELOMA AND ITS DIFFERENTIAL DIAGNOSIS

C. B. Wright, M.D.

Minneapolis

Dr. Wright gave a paper on the above subject and reported two cases. X-ray films were shown.

Our interest in multiple destructive bone lesions has been greatly increased recently by the brilliant results in the operative treatment of hyperparathyroidism. Not many clinicians have seen and recognized one of these cases, however, and most of us fear that we have probably overlooked the condition.

The following two case reports have interesting diagnostic features. Both had biopsies which were more confusing than diagnostic. In both, no Bence-Jones protein was found in the urine.

1. The first case was a man, aged fifty-one. There was no history of similar trouble in his family. There was a marked history of tuberculosis in both parents and two of his brothers had died from this disease. In his history the only thing of note was that as a child he had lumps on his head which later disappeared. He himself had no tuberculosis. He had been a well, vigorous man, and an athlete both in high school and college. His trouble began with pain in his left hip. He was examined first by a doctor about four months later. At that time his pain was very severe and apparently was aggravated by a cold and severe coughing. X-ray of the pelvis showed a large area of destruction in the wing of the left ileum which was approximately 9 cm. in diameter. This was the only definite lesion at that time. I saw him in March, 1930. At that time he had lumps in the ribs, and was having pains in his neck and right arm. He had a cyst in the lower jaw and on subsequent x-ray examinations up to January, 1931, he had developed lesions generally in both extremities, spine, ilium, ribs and skull. His pains seemed to be relieved very readily by x-ray. Sometimes lumps would appear and grow to the size of an egg in four to five days and disappear in two or three days more, according to his own statement. On examination, these lumps were soft, easily compressible, and seemed to be surrounded by a margin of bone. The man also had an anemia which was not a true secondary anemia but suggested a primary anemia by a relatively high color index, presence of normoblasts, marked changes in the red cells with a comparatively low white count. There was no Bence-Jones protein found in the urine at any time, The diagnosis of multiple myeloma was made, clinically and by x-ray. A biopsy was made (apparently from the back, according to the patient's wife). On this biopsy the pathologist made the diagnosis of a round cell sarcoma because of the fact that the tumor tissue seemed to be in a gland and completely outside the bone. This diagnosis was made elsewhere and the slides were not available for study.

Reviewing the clinical history, x-rays and biopsy, the clinician in charge at the time of the patient's death felt that the condition was probably due to a multiple myeloma. Multiple myeloma may, of course, actually break through the periosteum and be found in the surrounding tissue and way also be found primarily in lymph glands or apparently in any of the hematopoietic tissues. Hyperparathyroidism was not thought of at that time and in the review of the case there is nothing to suggest this condition.

2. The second case, however, had quite a different picture. This patient was a man, fifty-five years old. His past history and his family history were entirely negative. The onset of his condition was in March, 1935, and began with pain in his left thoracic region, hips and back. It gradually progressed until he had pains in his knees, hips, thighs, and muscles. In July, 1935, he had his first x-rays, which showed, acording to the report, marked decalcification of the bones of the pelvis and spine and narrowing of his vertebræ. He also showed an anemia which was not characteristically secondary in type. He showed no Bence-Jones protein in the urine. I saw him first in September, 1935. At that time he was chalky pale, having some gastrointestinal disturbances consisting of loss of appetite, constipation and gas; and he was having constant pain, especially over his left lower thoracic region. On feeling for his spleen a definite fracture at about the level of the ninth rib was diagnosed by the slipping of the anterior fragment under the finger. This produced very severe pain. He was also tender on pressure over the ribs, lower extremities, and back. He was again x-rayed and at this time he showed destructive lesions of his upper and lower extremities, left clavicle, ribs, pelvis, and also in his skull. He showed a very marked decalcification of the bony structures examined.

His blood count was hemoglobin 50 per cent, red cells 2,500,000, white cells 11,300. He showed marked changes in the size, shape, and staining of the red cells. The lymphocytes, small and large, were 50 per cent, polymorphonuclears 43 per cent, eosinophils 3 per cent, normoblasts 4, and 1 large monocyte.

The striking feature of the case was the very high blood calcium, which was 21.7 mgm. per 100 c.c. of blood, checked three times. There was no evidence of

glandular enlargement and no tumor palpable in the neck. Many of the bone lesions were fairly typical of those seen in hyperparathyroidism. Because of the rather low condition of the patient and the absence of a palpable tumor, deep x-ray therapy of the neck and ribs, where he was having his severest pain, was decided upon. This treatment relieved his pain completely and his general condition improved. His blood calcium subsequently seemed to show a continuous decrease. His anemia, however, did not improve but gradually grew a little worse. He was re-admitted for additional x-ray treatment about one month later because of increased pain in the pelvis and right side. The blood calcium had dropped to 16 mgm. He was given another course of deep x-ray over the neck, chest and pelvis. While in the hospital at this time a soft nodule was felt above his left eye about the size of a quarter. This nodule was easily compressible, and a margin of bone could be definitely felt around it. At this time it was decided to do a biopsy and the ninth rib on the left side was selected, where there seemed to be definite pathology by x-ray. A piece of the rib was scooped out with a curette and had apparently some soft tissue in it which disappeared on the way to the laboratory, because the report came back that there was no particular pathology in the specimen and that it was considered inadequate. X-ray showed no calcification in the kidneys.

He showed quite marked improvement as far as pain was concerned and was able to turn over in bed without assistance. He began eating well and sleeping well. In two months the blood calcium had dropped to 11.8 mgm. After several consultations, even in the absence of a palpable tumor, exploration of his parathyroids was decided upon. The reasons for doing this were: First, the markedly high blood calcium which seemed to decrease steadily after his x-ray therapy, indicating that the parathyroids might be overactive; second, the appearance of some of the x-ray lesions; and third, the hopelessness on any other basis seemed to justify exploration.

Operation was performed under local and a careful search was made without finding evidence of parathyroid tissue. The patient stood the operation very well for the first two days. Following the operation the patient called my attention to the fact that the lump on his forehead had apparently disappeared. It was not visible, although a softened area could be felt. Unfortunately, he developed pneumonia and died on the 8th day after operation.

Dr. Norris performed the autopsy. The striking finding, grossly, was the complete softening of the bones of the spine, the bodies of the vertebræ being easily cut with a knife; and the multiple destructive areas in the skull. In places there was seemingly nothing but the periosteum over these lesions.

To sum up, two cases of multiple myeloma, the first clear-cut clinically, confused by wrong interpretation of a biopsy; no autopsy. The second, clinically resembling hyperparathyroidism, biopsy unsatisfactory, the lesions typical of multiple myeloma on autopsy.

The meeting adjourned.

R. T. LaVake, M.D.,
Secretary.

WOMEN'S AUXILIARY
of the MINNESOTA STATE MEDICAL ASSOCIATION

The various county auxiliaries will soon be concluding this year's activities, and plan to meet in Rochester on May 4, 5 and 6 to talk things over and elect new officers for 1936-37. Here's hoping we will see all of you there. A most interesting session has been planned by the Rochester auxiliary and there are to be many social events as well as business.

The Nominating Committee of the State Auxiliary was entertained at luncheon recently by Mrs. Martin Nordland, Chairman, of Minneapolis. The recommendations of the various county auxiliaries were considered and the results will be heard at the annual meeting in Rochester.

Mrs. F. J. Elias, State President, was the honored guest at a public relations tea given by the Ramsey County Medical Auxiliary on March 23, at the home of Mrs. Wm. H. Von der Weyer, Saint Paul. Mrs. John J. Ryan, president of the Ramsey County Medical Auxiliary, presided at a business meeting preceding the tea. The principal speaker was Dr. Wm. A. O'Brien, University of Minnesota. There were representatives from approximately thirty-five women's organizations present. Arrangements for the tea were under the direction of Mrs. Asa Johnson.

From Hennepin County comes news that the Hennepin County Medical Society entertained the Auxiliary in honor of its 25th birthday. It was patterned after the Major Bowes Amateur Hour and was known as the "Chaste and Sunburn Hour." About 450 doctors and their wives attended this party. The evening was full of surprises and fun.

On April 13 the Hennepin County Auxiliary sponsored an Easter Card Party at the Walker Art Gallery. Mrs. R. G. Olson was general chairman of the arrangements. The party was very successful and the proceeds will be used for philanthropic work.

St. Louis County Auxiliary (Duluth) has reported on another highly successful bridge party. In spite of one of the spring snow storms which fell on the date, there were thirty-two tables filled for bridge.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for May

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 9:45 A. M. every Tuesday over Station WCCO, Minneapolis and St. Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

May 5—Child Health.
May 12—Diabetes Mellitus.
May 19—Cosmetic Dermatitis.
May 26—Apical Dental Infection.

Minnesota Medical Alumni

There will be a Minnesota Medical Alumni dinner at the American Medical Association convention in Kansas City on Wednesday, May 13, 1936, at 6:30 p. m. at the Baltimore Hotel. Tickets may be secured at the Alumni Banquet desk. It is hoped that all Minnesota men attending the convention will plan to eat dinner together at this time.

Minnesota Hospital Association

The thirteenth annual convention of the Minnesota Hospital Association will be held Thursday and Friday, May 14 and 15, 1936, in Saint Paul at the Lowry Hotel.

Meetings will include addresses by prominent physicians and hospital officials as well as round table discussions on the various aspects of hospital administration, service and nursing education.

In conjunction with the meeting of the Minnesota Hospital Association, sectional meetings of the following organizations will be held on Thursday, May 14:

Minnesota Record Librarians Association
Minnesota State Dietetic Association
Minnesota Anesthetists Association
Superintendents of Hospital Training Schools

The meetings are open to all interested in hospital administration and a cordial invitation is extended to everyone so interested.

Minnesota Radiological Society

The Spring Meeting of the Minnesota Radiological Society was held at the St. Paul Athletic Club, St. Paul, Minn., Saturday, March 28, 1936. The following program was presented:

Demonstration of Device for Serial Examination of the Duodenal Bulb.
H. Milton Berg, M.D., Bismarck, N. D.

Roentgen Findings in Monilia Infection of the Lungs.
Kano Ikeda, M.D., St. Paul

Radium Treatment of Postoperative Parotitis.
Robert Fricke, M.D., Rochester

Roentgenologic Findings in Chronic Gastritis.
Russell W. Morse, M.D., Minneapolis

Roentgenologic Changes in Non-Tropical Sprue.
John D. Camp, M.D., Rochester.

Congenital Solitary Kidney with Traumatic Rupture Clinically Diagnosed
Lester G. Ericksen, M.D., Dubuque, Iowa

Roentgen Treatment of Carcinoma of the Ovaries.
Lewis Jacobs, M.D., Minneapolis

Roentgen Diagnostic Quiz.
Conducted by Leo G. Rigler, M.D., Minneapolis

An informal dinner was held, following which there was an address by the guest of the Society, Dr. Ernst A. Pohle of Madison, Wis., on the "Radiological Treatment of Leukemia and Allied Disorders."

The next meeting of the Society will be held in connection with the meeting of the Minnesota State Medical Association in Rochester, Minn., May 4, 1936. Dr. Willis F. Manges of Philadelphia will be the guest speaker of the Society and will deliver the Carman Lecture to the members of the Minnesota State Medical Association on the subject, "Foreign Bodies."

Leo G. Rigler, *Secretary*

Northern Minnesota Medical Association

The annual meeting of the Northern Minnesota Medical Association will be held this year in Fergus Falls, Monday and Tuesday, August 31 and September 1. Dr. F. J. Hirschboeck of Duluth is chairman of the Program Committee.

Washington County

The Washington County Medical Society had its regular monthly meeting on Tuesday, April 14, at the Stillwater club rooms. The fourth and last fracture lecture was given by Dr. Wallace Cole, of Saint Paul, who discussed injuries and fractures to the shoulder, spine, chest and pelvis. X-rays and graphic descriptions of treatments accompanied the lecture. Dr. Everett K. Geer, St. Paul, interpreted the x-rays of those Stillwater High School pupils whose Mantoux tests had been positive. Of 200 taking this test thirty-six had had positive Mantoux reactions.

E. Sydney Boleyn, Secretary.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

HOW TO FEED CHILDREN IN NURSERY SCHOOLS. Mary E. Sweeny and Dorothy C. Buck, of the Merrill-Palmer School. 84 pages. Illus. (Free copies may be obtained from the Irradiated Evaporated Milk Institute, 203 N. Wabash Ave., Chicago.) Detroit: The Merrill-Palmer School, 1936.

BASAL METABOLISM IN HEALTH AND DISEASE. Eugene F. Dubois, M.D., Medical Director, Russell Sage Institute of Pathology; Professor of Medicine, Cornell University Medical College, etc. 494 pages. Illus. Price, cloth, $5.00. Philadelphia: Lea & Febiger, 1936.

PHYSIOLOGY OF LOVE. Paolo Mantegazza. Translated from the Italian by Herbert Alexander. Edited with an introduction by Victor Robinson, M.D. 237 pages. Price, cloth, $5.00. New York: Eugenics Publishing Co., 1936.

THE SINGLE, THE ENGAGED AND THE MARRIED. Maurice Chideckel, M.D. 268 pages. Price, cloth, $2.50. New York: Eugenics Publishing Co., 1936.

BEWILDERED PATIENT. Marian Staats Newcomer, M.D. 323 pages. Illus. Price, cloth, $1.75. Boston and New York: Hale, Cushman & Flint, 1936.

PEDIATRIC NURSING. John Zahorsky, A.B., M.D., F.A.C.P. Professor of Pediatrics, St. Louis University School of Medicine; Pediatrician-in-chief to the St. Mary's Group of Hospitals, etc. 568 pages. Illus. Price, cloth, $3.00. St. Louis: C. V. Mosby Co., 1936.

THE BALANCED DIET. Logan Clendening, M.D., Professor of Clinical Medicine, University of Kansas, etc. 207 pages. Illus. Price, cloth, $1.50. New York: D. Appleton-Century Co., 1936.

PARENTERAL THERAPY. Walton Forest Dutton, M.D., formerly Medical Director Polyclinic and Medico-Chirurgical Hospitals, Graduate School of Medicine, University of Pennsylvania, etc., and George Burt Lake, M.D., formerly Special Lecturer in Hygiene, Purdue University, etc. 376 pages. Illus. Price, cloth, $7.50. Springfield, Ill.: Charles C. Thomas, 1936.

ALLERGY OF THE NOSE AND PARANASAL SINUSES. French K. Hansel, M.D., M.S., Assistant Professor of Clinical Otolaryngology, Washington University School of Medicine, etc. 820 pages. Illus. Price, cloth, $10.00. St. Louis: C. V. Mosby Co., 1936.

CARDIOVASCULAR DISEASE. A new aspect of Cause and Treatment. J. H. Schrup, M.D., Dubuque, Iowa. (Reprint.) 20 pages. Price, paper cover, 12c.

THE TREATMENT OF DIABETES MELLITUS. Elliott P. Joslin, M.D., M.A., with the collaboration of Howard F. Root, M.D., Priscilla White, M.D., and Alexander Marble, M.D. 5th edition. 620 pages. Illus. Philadelphia: Lea and Febiger, 1935.

This book has been revised and rewritten; it follows the order of the fourth edition, but it covers the field more comprehensively and effectively, and it is more concise. The author stresses the danger of disregarded obesity, needless deaths resulting from tuberculosis (both in infants and adults), from arteriosclerosis, gangrene, and coma, infection, and all other complications of diabetes.

Dr. Joslin's associates contribute certain chapters giving their highly specialized knowledge of surgery, their handling of children and pregnancies complicated by diabetes. He suggests that we must resort to cesarean section more frequently than has been done to date to avoid loss of the infant and to prevent injury to and exhaustion of the mother.

This book should be read by every practitioner of medicine in order that he may realize the changes that have taken place in the treatment of diabetes, particularly as to low caloric, higher carbohydrate diets and the experimental and clinical reasons therefor.

M. M. SARNECKI, M.D.

INFANT NUTRITION. Williams McKim Marriott, B.S., M.D., Professor of Pediatrics, Washington University School of Medicine; Physician in Chief, St. Louis Children's Hospital, St. Louis, Mo. Second Edition. 431 pages. Illus. Price, $4.50. St. Louis: C. V. Mosby Company, 1935.

In this, the second edition, Dr. Marriott has fully revised and brought down to date the subject of infant nutrition. The first chapter, dealing with growth and nutrition, stresses the need for adequate physical growth in order that mental development may not be retarded.

Metabolism deals with the food values of the various substances ingested, and the necessity for a varied diet. He also discusses at length the nutritional elements and their place in infant feeding. The statement that "The giving of food of too low a caloric value to meet the infant's needs is by all odds the chief cause of failure in infant feeding," cannot be too strongly emphasized.

The chapter on vitamins adequately portrays the present status of these necessary elements in the diet.

The chapters on digestion and stools are worthy of careful perusal, while that on breast feeding is clear, concise and practical. The chapter on artificial feeding contains much information and covers the question of variety.

In the discussion of maltnutrition, diarrhea, vomiting, etc., the author shows evidence of a thorough knowledge of the problems involved.

The subject of prematurity is adequately dealt with and a newly added subject, allergy, is given full consideration.

A discussion of common affections covers a fairly large range of subjects, all of which are timely and informative.

The book as a whole will be found a reliable guide to any one interested in the many problems of infant nutrition.

J. T. CHRISTISON, M.D.

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Annual meeting, December
Number of Members: 23

President
Duncan, J. W.....Moorhead

Secretary
Flancher, L. H.....Lake Park

Aborn, W. H.....Hawley
*Archibald, F. M.....Mahnomen
Bergheim, M. C.....Hawley
Carman, J. E.....Detroit Lakes
Duncan, J. W.....Moorhead
Ellingson, A. R.....Detroit Lakes
Flancher, L. H.....Lake Park
Gosslee, G. L.....Moorhead
Hagen, O. J.....Moorhead
Haight, G. G.....Audubon
Humphrey, E. W.....Moorhead
Ingebrigtson, E. K.....Moorhead
Larsen, O. O.....Detroit Lakes
Larson, Arnold.....Detroit Lakes
Moberg, C. W.....Lake Park
Rutledge, L. H.....Detroit Lakes
Simison, C. W.....Hawley
Stafne, W. A.....Moorhead
Soine, T. S.....Barnesville
Thysell, F. A.....Moorhead
Thysell, V. D.....Hawley

DAKOTA COUNTY MEDICAL SOCIETY

President
Peck, L. D.....Hastings

Secretary
Burns, L. S.....South Saint Paul

Burns, L. S.....South Saint Paul
Peck, L. D.....Hastings
Peck, L. R.....Hastings

EAST CENTRAL MINNESOTA MEDICAL SOCIETY

Anoka, Chisago, Isanti, Kanabec, Mille Lacs, Pine and Sherburne Counties
Annual meeting, November
Number of Members: 34

President
Norrgard, H. T. ..... Milaca

Secretary
Hansen, E. H. ..... Princeton

Arends, A. L. ..... Askov
Blomberg, W. R. ..... Princeton
Blumenthal, J. S. ..... Columbia Heights
Bossert, C. S. ..... Mora
Brown, R. W. ..... Cambridge
Brownstone, Manuel ..... Sandstone
Callahan, F. F. ..... Pokegama
Cooney, H. C. ..... Princeton
Dredge, H. P. ..... Sandstone
Halpin, J. E. ..... Rush City
Hansen, E. H. ..... Princeton
Heseltine, V. G. ..... Taylors Falls
Holmes, A. E. ..... Rush City
Johnson, D. L. ..... Cambridge
Kelsey, C. G. ..... Hinckley
Kooiker, H. J. ..... Milaca
McBroom, D. E. ..... Cambridge
Ness, C. M. ..... Cambridge
Nethercott, E. G. ..... Pine City
Nordman, W. F. ..... Mora
Norrgard, H. T. ..... Milaca
Nygren, W. T. ..... Braham
Petersen, P. C. ..... Ogilvie
Peterson, A. A. ..... Mora
Roehlke, A. B. ..... Elk River
Schlesselman, George ..... Anoka
Spurzem, R. J. ..... Anoka
Stephan, E. L. ..... Hinckley
Stratte, A. K. ..... Pine City
Swensen, R. G. ..... Harris
Truog, C. P. ..... Lindstrom
Vik, Melvin ..... Onamia
Wahlberg, E. W. ..... Isle
Zeien, Thomas ..... North Branch

FREEBORN COUNTY MEDICAL SOCIETY

Regular meetings, Quarterly
Annual meeting, December
Number of Members: 23

President
Kaasa, L. J. ..... Albert Lea

Secretary
Gamble, P. M. ..... Albert Lea

Barr, L. C. ..... Albert Lea
Branham, D. S. ..... Albert Lea
Burns, H. D. ..... Albert Lea
Butturff, C. R. ..... Freeborn
Calhoun, F. W. ..... Albert Lea
Donovan, D. L. ..... Albert Lea
Folken, F. G. ..... Albert Lea
Freeman, J. P. ..... Albert Lea
Freligh, W. P. ..... Albert Lea
Gamble, J. W. ..... Albert Lea
Gamble, P. M. ..... Albert Lea
Gullixson, A. ..... Albert Lea
Jerome, Bourne ..... Emmons
Kaasa, L. J. ..... Albert Lea
Kamp, B. A. ..... Albert Lea
Leopard, B. A. ..... Albert Lea
Manley, L. V. ..... Albert Lea
Merrit, W. A. ..... Albert Lea
Palmer, C. F. ..... Albert Lea
Palmer, W. L. ..... Albert Lea
Schultz, J. A. ..... Albert Lea
Trytten, E. G. ..... Albert Lea
Whitson, S. A. ..... Alden

GOODHUE COUNTY MEDICAL SOCIETY

Regular meetings, none
Annual meeting, December
Number of Members: 20

President
Claydon, H. F. ..... Zumbrota

Secretary
Steffens, L. A. ..... Red Wing

Aanes, A. M. ..... Red Wing
Anderson, S. H. ..... Red Wing
Brusegard, J. F. ..... Red Wing
Claydon, D. R. ..... Red Wing
Claydon, H. F. ..... Zumbrota
Claydon, L. E. ..... Red Wing
Cremer, P. H. ..... Hastings
Flom, M. G. ..... Zumbrota
Hedin, R. F. ..... Red Wing
Johnson, A. E. ..... Red Wing
Jones, A. W. ..... Red Wing
Juers, E. H. ..... Red Wing
Levi, Sam ..... Red Wing
Liffrig, W. W. ..... Goodhue
Mack, J. J. ..... Magnolia, Arkansas
McGuigan, H. T. ..... Red Wing
Smith, M. W. ..... Red Wing
Steffens, L. A. ..... Red Wing
Vaaler, T. ..... Cannon Falls
Williams, M. R. ..... Cannon Falls

HENNEPIN COUNTY MEDICAL SOCIETY

Regular meetings, first Monday each month
Annual meeting, October
Number of Members: 570

President
Cranmer, R. R. ..... Minneapolis

Secretary
Campbell, O. J. ..... Minneapolis

Ahrens, R. S. ..... Minneapolis
Alexander, H. A. ..... Minneapolis
Aling, C. A. ..... Minneapolis
Allen, H. W. ..... Minneapolis
Allison, R. G. ..... Minneapolis
Altnow, H. O. ..... Minneapolis
Andersen, A. G. ..... Minneapolis
Andersen, S. C. ..... Minneapolis
Anderson, D. D. ..... Minneapolis
Anderson, E. D. ..... Minneapolis
Anderson, E. R. ..... Minneapolis
Anderson, F. J. ..... Minneapolis
Anderson, J. K. ..... Minneapolis
Anderson, K. W. ..... Minneapolis
Anderson, P. A. ..... Minneapolis
Andreassen, E. C. ..... Minneapolis
Andrews, R. S. ..... Minneapolis
Annis, H. B. ..... Minneapolis
Arey, S. L. ..... Excelsior
Arlander, C. E. ..... Minneapolis
Arnold, D. C. ..... Minneapolis
Arvidson, C. G. ..... Minneapolis
Aune, Martin ..... Minneapolis
Aurand, W. H. ..... Minneapolis
Avery, J. F. ..... Minneapolis
Baken, M. P. ..... Minneapolis
Baker, A. T. ..... Minneapolis
Baker, E. L. ..... Minneapolis
Baker, Looe ..... Minneapolis
Barber, J. P. ..... Minneapolis
Barron, Moses ..... Minneapolis
Bass, G. W. ..... Minneapolis
Baxter, S. H. ..... Minneapolis
Bayard, H. F. ..... Minneapolis
Beard, A. H. ..... Minneapolis
Beard, R. O. ..... Minneapolis
Beckman, W. G. ..... Minneapolis
Bedford, E. W. ..... Minneapolis
Bell, E. T. ..... Minneapolis
Benjamin, A. E. ..... Minneapolis
Benjamin, E. G. ..... Minneapolis
Benn, F. G. ..... Minneapolis
Berger, A. G. ..... Minneapolis
Berkwitz, N. J. ..... Minneapolis
Bessesen, A. N., Jr. ..... Minneapolis
Bessesen, D. H. ..... Minneapolis
Bessesen, W. A. ..... Minneapolis
Blake, James ..... Hopkins
Blaustone, H. H. ..... Minneapolis
Bockman, M. W. H. ..... Minneapolis
Boies, L. R. ..... Minneapolis
Booth, A. E. ..... Minneapolis
Borgeson, E. J. ..... Minneapolis
Bouman, H. A. H. ..... Minneapolis
Boynton, Ruth ..... Minneapolis
Bracken, H. M. ..... Minneapolis
Bratrud, A. F. ..... Minneapolis
Brooks, C. N. ..... Minneapolis
Brown, E. D. ..... Minneapolis
Brown, E. J. ..... Minneapolis
Bryant, O. R. ..... Minneapolis
Bulkley, Kenneth ..... Minneapolis
Bullard, Mattie J. ..... Minneapolis
Butler, John ..... Minneapolis
Buzzelle, L. K. ..... Minneapolis
Cable, M. L. ..... Minneapolis
Cabot, V. S. ..... Minneapolis
Cady, L. H. ..... Minneapolis
Callerstrom, G. W. ..... Minneapolis
Cameron, Isabell ..... Minneapolis
Camp, W. E. ..... Minneapolis
Campbell, L. M. ..... Minneapolis
Campbell, O. J. ..... Minneapolis
Cardle, A. E. ..... Minneapolis
Carey, J. B. ..... Minneapolis
Carlaw, C. M. ..... Minneapolis
Carlson, H. A. ..... Minneapolis
Carlson, Lawrence ..... Minneapolis
Caron, R. P. ..... Minneapolis
Cavanor, F. T. ..... Minneapolis
Cherry, C. H. ..... Minneapolis
Chesley, A. J. ..... Minneapolis
Christenson, C. R. ..... Minneapolis
Christianson, H. W. ..... Minneapolis
Clark, H. S. ..... Minneapolis
Cohen, S. S. ..... Oak Terrace
Condit, W. H. ..... Minneapolis
Cook, H. W. ..... Minneapolis
Cooperman, H. O. ..... Minneapolis
Corbett, J. F. ..... Minneapolis
Corniea, A. D. ..... Minneapolis
Cosman, E. O. ..... Minneapolis
Cottam, G. G. ..... Minneapolis
Crafts, L. M. ..... Minneapolis
Cranmer, R. R. ..... Minneapolis
Cranston, R. W. ..... St. Louis Park
Creevy, C. D. ..... Minneapolis
Creighton, R. H. ..... Minneapolis
Curtin, J. F. ..... Minneapolis
Cutts, George ..... Minneapolis
Cutts, R. E. ..... Minneapolis
Dady, E. E. ..... Minneapolis
Dahl, E. O. ..... Minneapolis
Dahl, J. A. ..... Minneapolis
Daniel, D. H. ..... Minneapolis
Daniel, L. M. ..... Minneapolis
Dart, L. O. ..... Minneapolis
Davis, J. C. ..... Minneapolis
del Plaine, C. W. ..... Minneapolis
Devereaux, T. J. ..... Wayzata
Diehl, H. S. ..... Minneapolis
Diessner, H. D. ..... Minneapolis
Donaldson, C. A. ..... Minneapolis
Dorge, R. I. ..... Minneapolis
Dornblaser, H. B. ..... Minneapolis
Dorsey, G. C. ..... Minneapolis
Doxey, G. L. ..... Minneapolis
Doyle, L. O. ..... Minneapolis
Drake, C. R. ..... Minneapolis
Drill, H. E. ..... Hopkins
Duff, E. R. ..... Minneapolis
Dukelow, D. A. ..... Minneapolis
Dumas, A. G. ..... Minneapolis
Dunlap, E. H. ..... Minneapolis
Dunn, G. R. ..... Minneapolis
Duryea, W. M. ..... Minneapolis
Dutton, C. E. ..... Minneapolis

Dvorak, B. A. ..... Minneapolis
Dwan, P. F. ..... Minneapolis
Dworsky, S. D. ..... Minneapolis
Ehrenberg, C. J. ..... Minneapolis
Ehrlich, S. P. ..... Minneapolis
Eich, Matthew ..... Minneapolis
Eisenstadt, D. H. ..... Minneapolis
Eitel, G. D. ..... Minneapolis
Ellison, D. E. ..... Minneapolis
Engstrand, O. J. ..... Minneapolis
Erb, F. A. ..... Minneapolis
Erdmann, C. A. ..... Minneapolis
Erickson, R. F. ..... Minneapolis
Ericson, R. M. ..... Minneapolis
Evans, E. T. ..... Minneapolis
Evans, R. D. ..... Minneapolis
Exley, E. W. F. ..... Minneapolis
Fahr, G. E. ..... Minneapolis
Fansler, W. A. ..... Minneapolis
Feeney, J. M. ..... Minneapolis
Fenger, E. P. K. ..... Oak Terrace
Fink, L. W. ..... Minneapolis
Fink, W. H. ..... Minneapolis
Fitzgerald, D. F. ..... Minneapolis
Fjeldstad, C. A. ..... Minneapolis
Ford, W. H. ..... Minneapolis
Foster, W. K. ..... Minneapolis
Fowler, L. H. ..... Minneapolis
Frary, Louise G. ..... Minneapolis
Fredericks, G. M. ..... Minneapolis
Freidman, L. L. ..... Minneapolis
Friedell, Aaron ..... Minneapolis
Fritzell, K. E. ..... Minneapolis
Froehlich, H. W. ..... Minneapolis
Funk, V. K. ..... Oak Terrace
Gammell, J. H. ..... Minneapolis
Gardner, E. L. ..... Minneapolis
Giere, E. O. ..... Minneapolis
Giere, J. C. ..... Minneapolis
Giere, R. W. ..... Minneapolis
Giessler, P. W. ..... Minneapolis
Gilles, F. L. ..... Minneapolis
Gingold, B. A. ..... Minneapolis
Golberg, M. L. ..... Minneapolis
Goldman, T. I. ..... Minneapolis
Gratzek, F. R. ..... Minneapolis
Grave, Floyd ..... Minneapolis
Gray, R. C. ..... Minneapolis
Green, E. K. ..... Minneapolis
Greene, W. P. ..... Minneapolis
Greisheimer, Esther M. ..... Minneapolis
Grimes, Marian ..... Minneapolis
Gronvall, P. R. ..... Minneapolis
Gunderson, N. A. ..... Minneapolis
Gustason, H. T. ..... Minneapolis
Hacking, F. H. ..... Minneapolis
Haggard, G. D. ..... Minneapolis
Hall, J. M. ..... Minneapolis
Hallberg, C. A. ..... Minneapolis
Hamel, A. L. ..... Minneapolis
Hamilton, A. S. ..... Minneapolis
Hamlin, G. B. ..... Minneapolis
Hannah, H. B. ..... Minneapolis
Hansen, E. W. ..... Minneapolis
Hansen, Olga S. ..... Minneapolis
Hanson, H. J. ..... Minneapolis
Hanson, H. V. ..... Minneapolis
Hanson, W. A. ..... Minneapolis
Harrington, C. D. ..... Minneapolis
Harrington, F. E. ..... Minneapolis
Harrison, W. C. ..... Minneapolis
Hart, V. L. ..... Minneapolis
Hartzell, T. B. ..... Minneapolis
Hastings, D. R. ..... Minneapolis
Haugen, J. A. ..... Minneapolis
Haverfield, Addie R. ..... Minneapolis
Hawkinson, R. P. ..... Robbinsdale
Hayes, J. M. ..... Minneapolis
Head, D. P. ..... Minneapolis
Head, G. D. ..... Minneapolis
Hedback, A. E. ..... Minneapolis
Heim, R. R. ..... Minneapolis
Helk, H. H. ..... Minneapolis
Hendrickson, J. F. ..... Minneapolis
Henrikson, E. C. ..... Minneapolis
Henry, C. E. ..... Minneapolis
Henry, M. O. ..... Minneapolis
Herbolsheimer, A. J. ..... Minneapolis
Herman, A. L. ..... Minneapolis
Hiebert, J. P. ..... Minneapolis
Higgins, J. H. ..... Minneapolis
Hill, E. J. ..... Minneapolis
Hirschfelder, A. D. ..... Minneapolis
Hirshfield, F. R. ..... Minneapolis
Hoaglund, A. W. ..... Minneapolis
Hobbs, C. A. ..... Minneapolis
Hodge, S. V. ..... Minneapolis
Hoffert, H. E. ..... Minneapolis
Holl, P. M. ..... Minneapolis
Holt, W. B. ..... Minneapolis
Howard, W. H. ..... Minneapolis
Houkom, Bjarne ..... Minneapolis
Huenekens, E. J. ..... Minneapolis
Hughes, L. D. ..... Minneapolis
Hultkrans, R. E. ..... Minneapolis
Hurd, Annah ..... Minneapolis
Hutchinson, C. J. ..... Minneapolis
Hymes, Charles ..... Minneapolis
Hynes, J. E. ..... Minneapolis
Irvine, H. G. ..... Minneapolis
Jackson, C. M. ..... Minneapolis
Jennings, F. L. ..... Oak Terrace
Jennings, Mary H. ..... Minneapolis
Jensen, Harry ..... Minneapolis
Jensen, M. J. ..... Minneapolis
Johnson, A. B. ..... Minneapolis
Johnson, A. E. ..... Minneapolis
Johnson, H. A. ..... Minneapolis
Johnson, J. A. ..... Minneapolis
Johnson, Julius ..... Minneapolis
Johnson, N. A. ..... Minneapolis
Johnson, Norman ..... Minneapolis
Johnson, R. A. ..... Minneapolis
Johnson, S. M. ..... Minneapolis
Johnson, Y. T. ..... Minneapolis
Johnston, L. F. ..... Minneapolis
Jones, G. M. ..... Minneapolis
Jones, H. W. ..... Minneapolis
Jones, W. R. ..... Minneapolis
Josewich, Alexander ..... Minneapolis
Kalin, O. T. ..... Minneapolis
Kelby, G. M. ..... Minneapolis
Kennedy, C. C. ..... Minneapolis
Kennedy, Jane F. ..... Minneapolis
Kennedy, R. R. ..... Minneapolis
Kertesz, G. ..... Minneapolis
Kibbe, O. A. ..... Minneapolis
King, E. A. ..... Minneapolis
King, H. T. ..... Minneapolis
Kinsella, T. J. ..... Minneapolis
Kistler, A. J. ..... Minneapolis
Kistler, C. M. ..... Minneapolis
Knapp, M. E. ..... Minneapolis
Knight, R. R. ..... Minneapolis
Knight, R. T. ..... Minneapolis
Koepcke, G. M. ..... Minneapolis
Koller, H. M. ..... Minneapolis
Koller, L. R. ..... Minneapolis
Kucera, F. J. ..... Hopkins
Kucera, W. J. ..... Minneapolis
Lajoie, J. M. ..... Minneapolis
Lapierre, A. P. ..... Minneapolis
Lapierre, C. A. ..... Minneapolis
Lapierre, J. T. ..... Minneapolis
Larsen, F. W. ..... Minneapolis
Larson, C. M. ..... Minneapolis
Larson, L. M. ..... Minneapolis
Larson, P. N. ..... Minneapolis
Laurent, A. A. ..... Minneapolis
LaVake, R. T. ..... Minneapolis
Laymon, C. W. ..... Minneapolis
Lazar, H. L. ..... Minneapolis
Leavitt, H. H. ..... Minneapolis
Lebowske, J. A. ..... Minneapolis
Lee, H. M. ..... Minneapolis
Leland, H. R. ..... Minneapolis
Lenz, O. A. ..... Minneapolis
Leonard, L. J. ..... Minneapolis
Leonard, Sam ..... Minneapolis
Levine, N. M. ..... Minneapolis
Lillehei, E. J. ..... Robbinsdale
Lind, C. J. ..... Minneapolis
Lindquist, R. H. ..... Minneapolis
Linner, H. P. ..... Minneapolis
Linton, W. B. ..... Minneapolis
Lipschultz, Oscar ..... Minneapolis
Litman, A. B. ..... Minneapolis
Litzenberg, J. C. ..... Minneapolis
Logefeil, R. C. ..... Minneapolis
Long, Jesse ..... Minneapolis
Loomis, E. A. ..... Minneapolis
Lundblad, R. A. ..... Minneapolis
Lundgren, A. C. ..... Minneapolis
Lundquist, E. F. ..... Minneapolis
Lynch, M. J. ..... Minneapolis
Lyon, E. P. ..... Minneapolis
Lysne, Henry ..... Minneapolis
MacDonald, A. E. ..... Minneapolis
MacDonald, D. A. ..... Minneapolis
MacDonald, I. C. ..... Minneapolis
Mach, F. B. ..... Minneapolis
Macnie, J. S. ..... Minneapolis
Makaroff, W. N. ..... Minneapolis
Maland, C. O. ..... Minneapolis
Marcley, W. J. ..... Minneapolis
Mariette, E. S. ..... Oak Terrace
Mark, D. B. ..... Minneapolis
Martinson, C. J. ..... Wayzata
Matchan, G. R. ..... Minneapolis
Matthews, Justus ..... Minneapolis
Mattill, P. M. ..... Oak Terrace
Mattson, Hamlin ..... Minneapolis
Maxeiner, S. R. ..... Minneapolis
May, W. H. ..... Minneapolis
McCarthy, Donald ..... Minneapolis
McCartney, J. S. ..... Minneapolis
McDaniel, Orianna ..... Minneapolis
McFarland, A. H. ..... Minneapolis
McGandy, R. F. ..... Minneapolis
McGeary, G. E. ..... Minneapolis
McGregor, Catherine ..... Minneapolis
McInerny, Maurice ..... Minneapolis
McIntyre, George ..... Minneapolis
McKinlay, C. A. ..... Minneapolis
McKinley, J. C. ..... Minneapolis
McKinney, F. S. ..... Minneapolis
McPheeters, H. O. ..... Minneapolis
McQuarrie, Irvine ..... Minneapolis
Mee, P. H. ..... Osseo
Meland, E. L. ..... Minneapolis
Merkert, C. E. ..... Minneapolis
Merkert, G. L. ..... Minneapolis
Merrill, Elizabeth ..... Minneapolis
Meyer, E. L. ..... Minneapolis
Michael, J. C. ..... Minneapolis
Michelson, H. E. ..... Minneapolis
Miller, H. E. ..... Minneapolis
Miller, J. C. ..... Minneapolis
Milton, J. S. ..... Minneapolis
Moe, J. H. ..... Minneapolis
Moir, W. W. ..... Minneapolis
Moorhead, Martha B. ..... Minneapolis
Moren, Edward ..... Minneapolis
Moriarty, Cecile R. ..... Minneapolis
Morrison, A. W. ..... Minneapolis
Morse, R. W. ..... Minneapolis
Morton, H. McI. ..... Vincentown, N. J.
Murphy, I. J. ..... Minneapolis
Myers, J. A. ..... Minneapolis
Nathanson, M. H. ..... Minneapolis
Neal, J. M. ..... Minneapolis
Neary, R. P. ..... Minneapolis
Neilson, H. F. ..... Minneapolis
Nelson, H. S. ..... Minneapolis
Nelson, Harvey ..... Minneapolis
Nelson, O. E. ..... Minneapolis
Newhart, Horace ..... Minneapolis
Nordin, G. T. ..... Minneapolis
Nordland, Martin ..... Minneapolis
Noth, H. W. ..... Minneapolis
Nystrom, Ruth ..... Minneapolis
Oberg, C. M. ..... Minneapolis
O'Brien, W. A. ..... Minneapolis
O'Donnell, J. E. ..... Minneapolis
Olson, F. A. ..... Minneapolis
Olson, O. A. ..... Minneapolis
Olson, R. G. ..... Minneapolis
Oppen, E. G. ..... Minneapolis
Owre, Oscar ..... Minneapolis
Parks, A. H. ..... Minneapolis
Patterson, W. E. ..... Minneapolis
Paulsen, E. L. ..... Minneapolis
Pearce, N. O. ..... Minneapolis
Pederson, R. M. ..... Minneapolis
Pennington, Reuben ..... Minneapolis
Peppard, T. A. ..... Minneapolis
Perry, R. St. J. ..... Minneapolis
Petersen, J. R. ..... Minneapolis
Petersen, Thorvald ..... Minneapolis
Peterson, Henry ..... Minneapolis
Peterson, H. W. ..... Minneapolis
Peterson, N. P. ..... Minneapolis
Peterson, O. H. ..... Minneapolis
Peterson, P. E. ..... Minneapolis
Peterson, W. C. ..... Minneapolis
Petit, L. J. ..... Minneapolis
Petter, C. K. ..... Oak Terrace
Pettit, C. W. ..... Minneapolis
Peyton, W. T. ..... Minneapolis
Pfunder, M. C. ..... Minneapolis
Phelps, K. A. ..... Minneapolis
Platou, E. S. ..... Minneapolis
Pollack, D. K. ..... Minneapolis
Pollard, D. W. ..... Minneapolis
Polzak, J. A. ..... Minneapolis
Poppe, F. H. ..... Minneapolis
Pratt, F. J. ..... Minneapolis
Pratt, J. A. ..... Minneapolis
Preine, I. A. ..... Minneapolis
Prim, J. A. ..... Minneapolis
Proshek, C. E. ..... Minneapolis
Quinby, T. F. ..... Minneapolis
Quist, H. W. ..... Minneapolis
Rasmussen, R. C. ..... St. Paul
Reed, C. A. ..... Minneapolis
Regnier, E. A. ..... Minneapolis
Reimann, H. A. ..... Minneapolis
Reynolds, J. S. ..... Minneapolis
Rice, C. O. ..... Minneapolis
Richardson, F. S. ..... Minneapolis
Richdorf, L. F. ..... Minneapolis
Rieke, W. W. ..... Wayzata
Rigler, L. G. ..... Minneapolis
Rishmiller, J. H. ..... Minneapolis
Rizer, R. I. ..... Minneapolis
Roan, C. M. ..... Minneapolis

Robb, E. F. ..... Minneapolis
Roberts, Stanley W. ..... Minneapolis
Roberts, T. S. ..... Minneapolis
Roberts, W. B. ..... Minneapolis
Robitshek, E. C. ..... Minneapolis
Rochford, W. E. ..... Minneapolis
Rodda, F. C. ..... Minneapolis
Rosen, Samuel ..... Minneapolis
Rosenwald, R. M. ..... Minneapolis
Rucker, C. W. ..... Minneapolis
Rucker, W. H. ..... Minneapolis
Rud, N. E. ..... Minneapolis
Rudell, G. L. ..... Minneapolis
Rupp, Alice ..... East Cleveland, Ohio
Russeth, A. N. ..... Minneapolis
Rusten, E. M. ..... Minneapolis
Sadler, W. P. ..... Minneapolis
St. Cyr, K. J. ..... Osseo
Saliterman, B. I. ..... Minneapolis
Salt, C. G. ..... Minneapolis
Samuelson, Samuel ..... Minneapolis
Sawatzky, W. A. ..... Minneapolis
Schaaf, F. H. K. ..... Minneapolis
Schaefer, W. G. ..... Minneapolis
Scheldrup, N. H. ..... Minneapolis
Scherer, L. R. ..... Minneapolis
Schmitt, A. F. ..... Minneapolis
Schmitt, S. C. ..... Minneapolis
Schneider, J. P. ..... Minneapolis
Schottler, M. E. ..... Minneapolis
Schultz, P. J. ..... Minneapolis
Schussler, O. F. ..... Minneapolis
Schwartz, V. J. ..... Minneapolis
Schwyzer, Gustav ..... Minneapolis
Scott, F. H. ..... Minneapolis
Scott, H. G. ..... Minneapolis
Seashore, Gilbert ..... Minneapolis
Seham, Max ..... Minneapolis
Seifert, M. H. ..... Excelsior
Selleseth, I. F. ..... Minneapolis
Shapiro, M. J. ..... Minneapolis
Siegmann, W. C. ..... Minneapolis
Silver, J. D. ..... Minneapolis
Simons, J. H. ..... Minneapolis
Simpson, E. D. ..... Minneapolis
Siperstein, D. M. ..... Minneapolis
Sivertsen, Ivar ..... Minneapolis
Skjold, A. C. ..... Minneapolis
Sloan, Julius ..... Minneapolis
Sloan, L. N. ..... Minneapolis
Smisek, F. M. ..... Minneapolis
Smith, A. E. ..... Minneapolis
Smith, A. M. ..... Minneapolis
Smith, H. R. ..... Minneapolis
Smith, N. M. ..... Minneapolis
Soderlind, R. T. ..... Minneapolis
Solhaug, S. B. ..... Minneapolis
Spano, J. P. ..... Minneapolis
Sperling, Louis ..... Minneapolis
Spratt, C. N. ..... Minneapolis
Stelter, L. A. ..... Minneapolis
Stenstrom, Annette T. ..... Minneapolis
Stewart, C. A. ..... Minneapolis
Stewart, R. I. ..... Minneapolis
Stomel, Joseph ..... Minneapolis
Strachauer, A. C. ..... Minneapolis
Strout, E. S. ..... Minneapolis
Strout, G. E. ..... Minneapolis
Sturre, J. R. ..... Minneapolis
Sullivan, R. M. ..... Minneapolis
Sundt, Mathias ..... Minneapolis
Swanson, Cephas ..... Minneapolis
Swanson, R. E. ..... Minneapolis
Sweetser, H. B., Jr. ..... Minneapolis
Sweetser, H. B., Sr. ..... Minneapolis
Sweetser, T. H. ..... Minneapolis
Sweitzer, S. E. ..... Minneapolis
Swendseen, C. G. ..... Minneapolis
Ternstrom, O. H. ..... Minneapolis
Thomas, G. E. ..... Minneapolis
Thomas, G. H. ..... Minneapolis
Thomas, G. J. ..... Minneapolis
Tingdale, A. C. ..... Minneapolis
Trueman, H. S. ..... Minneapolis
Tunstead, H. J. ..... Minneapolis
Turnacliff, D. D. ..... Minneapolis
Tyrrell, G. C. ..... Minneapolis
Ude, W. H. ..... Minneapolis
Ulrich, H. L. ..... Minneapolis
Undine, C. A. ..... Minneapolis
Urner, J. A. ..... Minneapolis
Voyer, E. O. ..... Minneapolis
Wahlquist, H. F. ..... Minneapolis
Waldron, C. W. ..... Minneapolis
Wall, C. R. ..... Minneapolis
Wangensteen, O. H. ..... Minneapolis
Wanous, E. Z. ..... Minneapolis
Ward, A. W. ..... Minneapolis
Ward, P. A. ..... Minneapolis
Warham, T. T. ..... Minneapolis
Watson, J. A. ..... Minneapolis
Webb, R. C. ..... Minneapolis
Weisman, S. A. ..... Minneapolis
Westman, R. T. ..... Minneapolis
Wethall, A. G. ..... Minneapolis
Wetherby, Macnider ..... Minneapolis
Weum, T. W. ..... Minneapolis
White, A. A. ..... Minneapolis
White, S. M. ..... Minneapolis
White, W. D. ..... Minneapolis
Whitesell, L. A. ..... Minneapolis
Widen, W. F. ..... Minneapolis
Wiese, H. F. B. ..... Minneapolis
Wilcox, A. E. ..... Minneapolis
Wilder, R. L. ..... Minneapolis
Wilken, P. A. ..... Minneapolis
Willcutt, C. E. ..... Minneapolis
Williams, Robert ..... Minneapolis
Winer, L. H. ..... Minneapolis
Winther, Nora M. C. ..... Minneapolis
Witham, C. A. ..... Minneapolis
Wittich, F. W. ..... Minneapolis
Wohlrabe, A. A. ..... Minneapolis
Wohlrabe, C. F. ..... Minneapolis
Woodworth, Elizabeth ..... Minneapolis
Wright, C. B. ..... Minneapolis
Wright, C. D. ..... Minneapolis
Wright, F. R. ..... Minneapolis
Wyatt, O. S. ..... Minneapolis
Wynne, H. M. N. ..... Minneapolis
Ylvisaker, R. S. ..... Minneapolis
Yoerg, O. W. ..... Minneapolis
Zaworski, E. A. ..... Minneapolis
Zierold, A. A. ..... Minneapolis
Ziskin, Thomas ..... Minneapolis

KANDIYOHI-SWIFT-MEEKER COUNTY MEDICAL SOCIETY

Regular meetings, third Wednesday of month
Annual meeting, December
Number of Members: 31

President
Macklin, W. E. ..... Litchfield

Secretary
Scofield, C. L. ..... Benson

Anderson, R. E. ..... Willmar
Arnson, J. M. ..... Benson
Behmler, F. W. ..... Appleton
Branton, A. F. ..... Willmar
Branton, B. J. ..... Willmar
Brigham, Frank ..... Watkins
Daignault, Oscar ..... Benson
Danielson, K. A. ..... Litchfield
Danielson, Lennox ..... Litchfield
Dowswell, W. J. ..... Kerkhoven
Edwards, G. C. ..... Grove City
Fiksdahl, M. J. ..... Willmar
Fredrickson, Alice C. ..... Lake Lillian
Fredrickson, G. U. Y. ..... Lake Lillian
Frisch, F. P. ..... Willmar
Frost, E. H. ..... Willmar
Giere, S. W. ..... Benson
Hodapp, R. J. ..... Willmar
Hutchinson, Henry ..... Willmar
Jacobs, D. C. ..... Willmar
Jacobs, J. C. ..... Willmar
Jensen, H. H. ..... Atwater
Johnson, Hans ..... Kerkhoven
Kaufman, W. C. ..... Appleton
Macklin, W. E., Jr. ..... Litchfield
Noble, J. L. ..... Willmar
O'Connor, D. C. ..... Eden Valley
Petersen, M. C. ..... Willmar
Scofield, C. L. ..... Benson
Telford, V. J. ..... Litchfield
Wilmot, H. E. ..... Litchfield

LYON-LINCOLN COUNTY MEDICAL SOCIETY

Annual meeting, October
Number of Members: 22

President
Monson, L. J. ..... Hendricks

Secretary
Workman, H. M. ..... Tracy

Bossingham, O. N. ..... Lake Benton
Ford, B. C. ..... Marshall
Germo, Charles ..... Balaton
Golden, C. M. ..... Tyler
Gray, F. D. ..... Marshall
Happe, L. J. ..... Marshall
Helferty, J. K. ..... Tracy
Hermanson, P. E. ..... Hendricks
Hoidale, A. D. ..... Tracy
Jacquot, G. L. ..... Marshall
Monson, L. J. ..... Hendricks
Persons, C. E. ..... Marshall
Purves, G. H. ..... Russell
Robertson, J. B. ..... Minneapolis
Sanderson, E. T. ..... Minneota
Schmidt, P. G. ..... Cottonwood
Thordarson, Theodore ..... Minneota
Vadheim, A. L. ..... Tyler
Valentine, W. H. ..... Tracy
Workman, H. M. ..... Tracy
Workman, W. G. ..... Tracy
Yaeger, W. W. ..... Ivanhoe

McLEOD COUNTY MEDICAL SOCIETY

Regular meetings, Quarterly or at call of President
Annual meeting, January or February
Number of Members: 19

President
Fine, B. A. ..... Winsted

Secretary
Goss, H. C. ..... Glencoe

Clement, J. B. ..... Lester Prairie
Fine, B. A. ..... Winsted
Goss, H. C. ..... Glencoe
Holm, H. H. ..... Glencoe
Jensen, A. H. ..... Hutchinson
Jensen, A. M. ..... Brownton
Klima, W. W. ..... Stewart
Langhoff, A. H. ..... Glencoe
Lippmann, E. W. ..... Hutchinson
McMahon, M. J. ..... Green Isle
Ninneman, N. N. ..... Silver Lake
Rempel, D. D. ..... Brownton
Sahr, W. G. ..... Hutchinson
Scholpp, O. W. ..... Hutchinson
Sheppard, Fred ..... Hutchinson
Sheppard, P. E. ..... Hutchinson
Schmidt, W. R. ..... Glencoe
Tinker, C. W. ..... Stewart
Trutna, T. J. ..... Silver Lake

MOWER COUNTY MEDICAL SOCIETY

Regular meetings, last Thursday each month except June, July and August
Annual meeting, last Thursday in November
Number of Members: 24

President
McKenna, J. K. ..... Austin

Secretary
Robertson, P. A. ..... Austin

Allen, A. W. ..... Austin
Allen, C. C. ..... Austin
Anderson, U. S. ..... Austin
Cronwell, B. J. ..... Austin
Flanagan, L. G. ..... Austin
Greene, H. H. ..... Austin
Grise, W. B. ..... Austin
Havens, J. G. W. ..... Austin
Hegge, O. H. ..... Austin
Hegge, R. S. ..... Austin
Henslin, A. E. ..... Le Roy
Hertel, G. E. ..... Austin
Leck, P. C. ..... Austin
Lommen, P. A. ..... Austin
McKenna, J. K. ..... Austin
Melzer, G. R. ..... Lyle
Mitchell, R. S. ..... Grand Meadow
Morrow, J. ..... Austin
Morse, M. P. ..... Le Roy
Robertson, P. A. ..... Austin
Schneider, P. J. ..... Adams
Sheedy, C. L. ..... Austin
Schottler, G. J. ..... Dexter
Thomson, J. M. ..... Brownsdale

NICOLLET-LE SUEUR COUNTY MEDICAL SOCIETY

Regular meetings, first Tuesday, April, September, and December
Annual meeting, December
Number of Members: 16

President
Strathern, F. P. ..... St. Peter

Secretary
Ericson, Swan ..... Le Sueur

Aitkens, H. B. ..... Le Center
Covell, W. W. ..... St. Peter
Curtis, R. A. ..... Le Center
Ericson, Swan ..... Le Sueur
Freeman, G. H. ..... St. Peter
Gully, R. J. ..... St. Peter
Hinixer, P. J. ..... Le Sueur
Holtan, Theodore ..... Waterville
Kerschbaumer, Louisa ..... St. Peter
Kolars, J. J. ..... Le Center
Lenander, M. E. ..... St. Peter
Nilson, H. J. ..... North Mankato
Sonnesyn, N. N. ..... Le Sueur
Strathern, F. P. ..... St. Peter
Traxler, F. J. ..... Henderson
Wolner, O. H. ..... St. Peter

OLMSTED-HOUSTON-FILLMORE-DODGE COUNTY MEDICAL SOCIETY

Regular meetings, first Wednesday every odd month
Annual meeting, first Wednesday in November
Number of Members: 291

President
Mayo, C. W. ..... Rochester

Secretary
Piper, M. C. ..... Rochester

Adson, A. W. ..... Rochester
Allen, E. V. ..... Rochester
Alvarez, W. C. ..... Rochester
Amberg, Samuel ..... Rochester
Anderson, C. M. ..... Rochester
Anderson, M. J. ..... Rochester
Anderson, N. E. ..... Harmony
Anderson, N. H. ..... Spring Valley
Annis, J. W. ..... Rochester
Armstrong, T. D. ..... Rochester
Baggenstoss, A. H. ..... Rochester
Bailey, R. J. ..... Rochester
Bair, H. L. ..... Rochester
Baird, L. W. ..... Rochester
Baker, C. P. ..... Rochester
Baker, G. S. ..... Rochester
Baker, H. R. ..... Hayfield
Baker, T. W. ..... Rochester
Balfour, D. C. ..... Rochester
Bannick, E. G. ..... Rochester
Bargen, J. A. ..... Rochester
Barker, N. W. ..... Rochester
Barnes, A. R. ..... Rochester
Bedard, R. E. ..... Rochester
Behrend, Albert ..... Rochester
Beiswanger, R. H. ..... Wykoff
Belote, G. B. ..... Caledonia
Benedict, W. L. ..... Rochester
Berkman, D. M. ..... Rochester
Berkman, J. M. ..... Rochester
Bethlach, C. J. ..... Rochester
Bigelow, C. E. ..... Dodge Center
Binger, M. W. ..... Rochester
Blake, T. W. ..... Rochester
Blum, B. B. ..... Rochester
Boothby, W. M. ..... Rochester
Bowing, H. H. ..... Rochester
Braasch, W. F. ..... Rochester
Brink, J. R. ..... Rochester
Brown, A. E. ..... Rochester
Brown, P. W. ..... Rochester
Brunsting, H. A. ..... Rochester
Brunsting, L. A. ..... Rochester
Buchstein, H. F. ..... Rochester
Buchtel, H. A. ..... Rochester
Buie, L. A. ..... Rochester
Burch, H. A. ..... Rochester
Butsch, W. L. ..... Rochester
Butt, H. R. ..... Rochester
Cabot, Hugh ..... Rochester
Camp, J. D. ..... Rochester
Canfield, W. W. ..... Houston
Carlson, L. A. ..... Rochester
Carmichael, F. A., Jr. ..... Rochester
Clagett, O. T. ..... Rochester
Clark, L. W. ..... Spring Valley
Clark, R. L., Jr. ..... Rochester
Clifton, T. A. ..... Chatfield
Coffey, R. J. ..... Rochester
Comfort, M. W. ..... Rochester
Conner, H. M. ..... Rochester
Cook, E. N. ..... Rochester
Counseller, V. S. ..... Rochester
Cragg, R. W. ..... Rochester
Craig, W. McK. ..... Rochester
Crenshaw, J. L. ..... Rochester
Crewe, J. E. ..... Rochester
Cusick, P. L. ..... Rochester
Davenport, L. H. ..... Rochester
Davis, A. C. ..... Rochester
Davis, I. G. ..... Rushford
Desjardins, A. U. ..... Rochester
Dietrich, F. S., Jr. ..... Rochester
Dixon, C. F. ..... Rochester
Dolder, F. C. ..... Eyota
Drake, F. A. ..... Lanesboro
Drips, Della G. ..... Rochester
Dry, T. J. ..... Rochester
Eaton, L. McK. ..... Rochester
Edward, George ..... Canton
Emmett, J. L. ..... Rochester
Erich, J. B. ..... Rochester
Erickson, C. W. ..... Rochester
Eusterman, G. B. ..... Rochester
Evarts, A. B. ..... Rochester
Faber, J. E. ..... Rochester
Famiglietti, E. V. ..... Rochester
Fatherree, T. J., Jr. ..... Rochester
Fawcett, C. E. ..... Stewartville
Figi, F. A. ..... Rochester
Fisher, Laura M. ..... Rochester
Foley, M. P. ..... Rochester
Foster, F. P. ..... Rochester
Fricke, R. E. ..... Rochester
Fuller, Alice H. ..... Rochester
Gaarde, F. W. ..... Rochester
Ghormley, R. K. ..... Rochester
Gibson, W. R. ..... Rochester
Giffin, H. Z. ..... Rochester
Gillespie, D. L. ..... Rochester
Gilpin, S. F., Jr. ..... Rochester
Goldsmith, Grace A. ..... Rochester
Gray, H. K. ..... Rochester
Griffin, A. M. ..... Rochester
Gunderson, M. J. ..... Rochester
Gurney, C. E. ..... Rochester
Habein, H. C. ..... Rochester
Haines, S. F. ..... Rochester
Hale, D. E. ..... Rochester
Hall, B. E. ..... Rochester
Hallenbeck, D. F. ..... Rochester
Harrington, S. W. ..... Rochester
Hartman, H. R. ..... Rochester
Havens, F. Z. ..... Rochester
Hebert, W. H. J. ..... Rochester
Heck, F. J. ..... Rochester
Heilman, F. R. ..... Rochester
Helland, G. M. ..... Spring Grove
Helland, J. W. ..... Spring Grove
Helmholz, H. F. ..... Rochester
Hempstead, B. E. ..... Rochester
Hench, P. S. ..... Rochester
Henderson, M. S. ..... Rochester
Herrell, W. E. ..... Rochester
Hertzog, A. J. ..... Rochester
Hewitt, Edith S. ..... Rochester
Hewitt, R. M. ..... Rochester
Heverdale, O. C. ..... Rochester
Hill, E. M. ..... Big Timber, Montana
Hines, E. A., Jr. ..... Rochester
Hinshaw, H. C. ..... Rochester
Horton, B. T. ..... Rochester
Howell, L. P. ..... Rochester
Hubly, J. W. ..... Rochester
Hunt, A. B. ..... Rochester
Jackman, R. J. ..... Rochester
Johnson, H. P. ..... Harmony
Johnson, R. B. ..... Lanesboro
Jones, H. M. ..... Rochester
Joyce, G. I. ..... Stewartville
Joyce, G. T. ..... Rochester
Kaump, D. H. ..... Rochester
Keith, N. M. ..... Rochester
Kemble, J. W. ..... Rochester
Kennedy, R. L. J. ..... Rochester
Kepler, E. J. ..... Rochester
Kernohan, J. W. ..... Rochester
Kirklin, B. R. ..... Rochester
Kirklin, O. L. ..... Rochester
Knepper, P. A. ..... Rochester
Koelsche, G. A. ..... Rochester
Kroeze, R. G. ..... Rochester
Krusen, F. H. ..... Rochester
Lannin, J. C. ..... Mabel
Leddy, E. T. ..... Rochester
Lemon, R. G. ..... Rochester
Lemon, W. S. ..... Rochester
Lenton, H. P. ..... Rochester
Leser, R. U. ..... Rochester
Lewis, E. B. ..... Rochester
Lillie, H. I. ..... Rochester
Lochead, D. C. ..... Rochester
Logan, A. H. ..... Rochester
Love, J. G. ..... Rochester
Luden, Georgine ..... Victoria, B. C., Can.
Lundy, J. S. ..... Rochester
Macey, H. B. ..... Rochester
Magath, T. B. ..... Rochester
Magiera, Estelle A. ..... Rochester
Malerich, J. A. ..... Caledonia
Mann, F. C. ..... Rochester
Marcley, D. M. ..... Rochester
Masson, D. M. ..... Rochester
Masson, J. C. ..... Rochester
Mayo, C. H. ..... Rochester
Mayo, C. W. ..... Rochester
Mayo, J. G. ..... Rochester
Mayo, W. J. ..... Rochester
Maytum, C. K. ..... Rochester
McCarty, W. C. ..... Rochester
McDonald, J. R. ..... Rochester
McGowan, J. M. ..... Rochester
McKaig, C. B. ..... Pine Island
McKechnie, R. E. ..... Rochester
McKean, R. S. ..... Rochester
McLean, A. R. ..... Rochester
McTamaney, R. A. ..... Rochester
Meyerding, H. W. ..... Rochester
Mills, J. H. ..... Rochester
Moersch, F. P. ..... Rochester
Moersch, H. J. ..... Rochester
Montgomery, Hamilton ..... Rochester
Morlock, C. G. ..... Rochester
Mulrooney, R. E. ..... Rochester
Mussey, R. D. ..... Rochester
Nass, H. A. ..... Mabel
Nesselrod, J. P. ..... Rochester
Nettrour, W. S. ..... Rochester
New, G. B. ..... Rochester
Odel, H. M. ..... Rochester
O'Leary, P. A. ..... Rochester
Olson, E. A. ..... Pine Island
Olson, P. F. ..... Rochester
O'Neal, B. L. ..... Rochester
Onsgard, L. K., Jr. ..... Houston
Onsgard, L. K., Sr. ..... Houston
Pace, J. McI. ..... Haskell, Texas
Parker, R. L. ..... Rochester
Parkhill, Edith M. ..... Rochester
Pemberton, J. deJ. ..... Rochester
Peterson, D. L. ..... Rochester
Pilcher, Frederick, Jr. ..... Rochester
Piper, M. C. ..... Rochester
Plummer, H. S. ..... Rochester
Plummer, W. A. ..... Rochester
Pollock, L. W. ..... Rochester
Pool, T. L. ..... Rochester
Popp, W. C. ..... Rochester
Powell, W. N. ..... Rochester
Powers, F. H. ..... Rochester
Prangen, A. D. ..... Rochester
Prickman, L. E. ..... Rochester
Priestley, J. T. ..... Rochester
Raaf, J. E. ..... Rochester
Randall, L. M. ..... Rochester
Rhorer, R. J. ..... Rochester
Rivers, A. B. ..... Rochester
Robertson, H. E. ..... Rochester
Robinson, V. C. ..... Rochester
Rosenow, E. C. ..... Rochester
Rozendaal, H. M. ..... Rochester
Rynearson, E. H. ..... Rochester
Sanford, A. H. ..... Rochester
Saunders, T. S., Jr. ..... Rochester
Scherer, R. G. ..... Dubuque, Iowa
Schmidt, H. W. ..... Rochester
Schulhof, M. G. ..... Rochester
Searles, P. W. ..... Rochester
Secord, E. W. ..... Rochester
Sheldon, W. D. ..... Rochester
Shoemaker, Rosemary ..... Rochester
Simonton, K. M. ..... Rochester
Slocumb, C. H. ..... Rochester
Smith, B. F. ..... Rochester
Smith, F. D. ..... Kasson
Smith, F. L. ..... Rochester
Smith, H. L. ..... Rochester
Smith, N. D. ..... Rochester

Snell, A. M.....Rochester
Soderstrom, Edwin .....Rochester
Sowers, B. F.....Rochester
Stalker, L. K.....Rochester
Steenrod, E. J.....Rochester
Stickney, J. M.....Rochester
Strohl, E. L.....Rochester
Stuhler, L. G.....Rochester
Sullivan, R. R.....Rochester
Sutherland, C. G.....Rochester
Teem, M. Van B.....Rochester
Thiessen, N. W.....Rochester
Thompson, G. J.....Rochester
Tierney, C. M.....Harmony
Tillisch, J. H.....Rochester
Tovell, R. M.....Rochester
Tuohy, E. B.....Rochester
Turnbull, Andrew .....Rochester
Vinson, P. P.....Rochester
Wagener, H. P.....Rochester
Wakefield, E. G.....Rochester
Walters, Waltman .....Rochester
Ward, C. E.....Rochester
Watkins, C. H.....Rochester
Waugh, J. M.....Rochester
Weber, H. M.....Rochester
Weir, J. F.....Rochester
Welch, C. S.....Rochester
Wellbrock, W. L. A.....Rochester
Welsh, A. L.....Rochester
Wesson, H. R.....Rochester
Wilbur, D. L.....Rochester
Wilder, R. M.....Rochester
Whittaker, L. D.....Rochester
Williams, R. V.....Rushford
Willius, F. A.....Rochester
Wilson, L. B.....Rochester
Wolff, L. H.....Rochester
Woltman, H. W.....Rochester
Wood, H. G.....Rochester
Woodruff, C. W.....Chatfield
Zellhoefer, H. W. K.....Rochester
Zide, H. A.....Rochester

PARK REGION DISTRICT AND COUNTY MEDICAL SOCIETY

Douglas, Grant, Otter Tail and Wilkin Counties
Regular meetings, Second Wednesday every even month
Annual meeting, December
Number of Members: 53

President
Drought, W. W.....Fergus Falls

Secretary
Baker, N. H.....Fergus Falls

Arndt, H. W.....Frazee
Baker, A. C.....Fergus Falls
Baker, N. H.....Fergus Falls
Bergquist, K. E.....Battle Lake
Blakey, A. R.....Osakis
Boline, C. A.....Battle Lake
Boyd, L. M.....Alexandria
Boysen, Peter .....Pelican Rapids
Broker, W. S.....Battle Lake
Burnap, W. L.....Fergus Falls
Clifford, G. W.....Osakis
Combacker, L. C.....Fergus Falls
Cowing, P. G.....Evansville
Drought, W. W.....Fergus Falls
Esser, John.....Perham
Estrem, C. O.....Fergus Falls
Gardner, W. P.....Fergus Falls
Gronewald, Tula W.....Fergus Falls
Hanson, E. C.....New York Mills
Hand, W. R.....Elbow Lake
Haskell, A. D.....Alexandria
Heiberg, E. A.....Fergus Falls
Hodgson, C. H.....Fergus Falls
Jacobs, G. C.....Fergus Falls
Johnson, O. V.....Fergus Falls
Katzberg, L. W.....Fergus Falls
Kierland, P. E.....Alexandria
Lee, W. A.....Fergus Falls
Leibold, H. H.....Parkers Prairie
Lewis, A. J.....Henning
Love, F. A.....Carlos
Lund, C. J. T.....Underwood
Meckstroth, C. W.....Brandon
Miller, W. A.....New York Mills
Naegeli, Frank .....Fergus Falls
Nelson, W. I.....Minneapolis
Otto, H. C.....Frazee
Parson, Lillian B.....Elbow Lake
Parson, L. R.....Elbow Lake
Patterson, W. L.....Fergus Falls
Paulson, T. S.....Fergus Falls
Powers, F. W.....Barrett
Randall, A. M.....Ashby
Reeve, E. T.....Elbow Lake
Rimer, E. W.....Breckenridge
Satersmoen, Theodore...Pelican Rapids
Sather, E. R.....Alexandria
Serkland, J. C.....Rothsay
Steube, R. W.....Alexandria
Sutton, H. R.....Hoffman
Tanquist, E. J.....Alexandria
Vail, J. B.....Henning
Wray, W. E.....Campbell

RAMSEY COUNTY MEDICAL SOCIETY

Regular meetings, last Monday in every month excepting June, July, August
Annual meeting, last Monday in January
Number of Members: 334

President
Schulze, A. G.....St. Paul

Secretary
Hultkrans, J. C.....St. Paul

Abbott, J. S.....St. Paul
Ahrens, A. E.....St. Paul
Ahrens, A. H.....St. Paul
Alberts, M. W.....St. Paul
Alden, J. F.....St. Paul
Alexander, F. H.....St. Paul
Armstrong, J. M.....St. Paul
Arnquist, A. S.....St. Paul
Aurelius, J. R.....St. Paul
Ausman, C. F.....St. Paul
Backus, A. S.....St. Paul
Bacon, D. K.....St. Paul
Bacon, L. C.....St. Paul
Barry, L. W.....St. Paul
Barsness, Nellie.....St. Paul
Beadie, W. D.....Cannon Falls
Beals, Hugh .....St. Paul
Beck, H. O.....St. Paul
Bell, C. C.....St. Paul
Benepe, J. L.....St. Paul
Bennion, P. H.....St. Paul
Bentley, N. P.....St. Paul
Berrisford, P. D.....St. Paul
Bicek, J. F.....St. Paul
Binger, H. E.....St. Paul
Birnberg, T. L.....St. Paul
Bock, R. A.....St. Paul
Boeckmann, Egil.....St. Paul
Bohland, E. H.....St. Paul
Bolender, H. L.....St. Paul
Borg, J. F.....St. Paul
Bouma, L. R.....St. Paul
Brand, G. D.....St. Paul
Bray, E. R.....St. Paul
Briggs, J. F.....St. Paul
Brodie, W. D.....St. Paul
Brown, E. I.....St. Paul
Brown, J. C.....St. Paul
Bulinski, T. J.....St. Paul
Burch, F. E.....St. Paul
Burns, R. M.....St. Paul
Burton, C. G.....St. Paul
Busher, H. H.....St. Paul
Caldwell, J. P.....St. Paul
Campbell, J. E.....South St. Paul
Carroll, W. C.....St. Paul
Chatterton, C. C.....St. Paul
Christiansen, A. .....St. Paul
Christison, J. T.....St. Paul
Clark, T. C.....Minneapolis
Colby, Woodard .....St. Paul
Cole, W. H.....St. Paul
Collie, H. G.....St. Paul
Colvin, A. R.....St. Paul
Connor, C. E.....St. Paul
Cook, C. K.....St. Paul
Countryman, R. S.....St. Paul
Cowern, E. W.....North St. Paul
Critchfield, L. R.....St. Paul
Culligan, J. M.....St. Paul
Dack, L. G.....St. Paul
Darling, J. B.....St. Paul
Daugherty, E. B.....St. Paul
Daugherty, L. E.....St. Paul
Davis, Herbert .....St. Paul
Davis, William .....St. Paul
Dedolph, Karl .....St. Paul
Delavan, P. A.....St. Paul
Derauf, B. I.....St. Paul
Dickson, T. H., Jr.....St. Paul
Dittman, G. C.....St. Paul
Donohue, P. F.....St. Paul
Dovre, C. M.....St. Paul
Drake, C. B.....St. Paul
Dunn, J. N.....St. Paul
Earl, G. A.....St. Paul
Earl, Robert .....St. Paul
Edlund, G. .....St. Paul
Ely, O. S.....South St. Paul
Emerson, E. C.....St. Paul
Endress, E. K.....St. Paul
Engberg, E. J.....St. Paul
Ernest, G. C.....St. Paul
Eshelby, E. C.....St. Paul
Fahey, E. W.....St. Paul
Ferguson, J. C.....St. Paul
Fesler, H. H.....St. Paul
Flanagan, H. F.....St. Paul
Fogarty, C. W.....St. Paul
Fogelberg, E. J.....St. Paul
Foley, F. E. B.....St. Paul
Freeman, C. D.....St. Paul
Gager, E. C.....St. Paul
Garbrecht, Arthur .....St. Paul
Gardiner, D. G.....St. Paul
Geer, E. K.....St. Paul
Gehlen, J. M.....St. Paul
Geist, G. A.....St. Paul
Ghent, C. H.....St. Paul
Ghent, M. M.....St. Paul
Gibbs, E. C.....St. Paul
Gilfillan, J. S.....St. Paul
Ginsberg, S. T.....St. Paul
Ginsberg, Wm. .....St. Paul
Goltz, E. V.....St. Paul
Grant, H. W.....St. Paul
Gratzek, Thomas .....St. Paul
Gruenhagen, A. P.....St. Paul
Hagaman, G. K.....St. Paul
Hall, A. R.....St. Paul
Hall, H. H.....St. Paul
Hammes, E. M.....St. Paul
Hammond, J. F.....St. Paul
Harmon, G. E.....St. Paul
Hartfiel, W. F.....St. Paul
Hartley, E. C.....St. Paul
Hassett, M. F.....St. Paul
Hauser, V. P.....St. Paul
Hawkins, V. J.....St. Paul
Heath, A. C.....Stillwater
Heck, W. W.....St. Paul
Hedenstrom, F. G.....St. Paul
Hengstler, W. H.....St. Paul
Hensel, C. N.....St. Paul
Heron, R. C.....St. Paul
Herrmann, E. T.....St. Paul
Hesselgrave, S. S.....St. Paul
Hilger, A. W.....St. Paul
Hilger, D. D.....St. Paul
Hilger, L. A.....St. Paul
Hiniker, L. P.....St. Paul
Hochfilzer, J. J.....St. Paul
Hoff, Alfred .....St. Paul
Hoffman, M. H.....St. Paul
Holcomb, J. T.....St. Paul
Holcomb, O. W.....St. Paul
Holt, J. E.....St. Paul
Howard, M. A.....St. Paul
Howard, W. S.....St. Paul
Hullsiek, R. B.....St. Paul
Hultkrans, J. C.....St. Paul
Ide, A. W.....St. Paul
Ikeda, Kano.....St. Paul
Ingerson, C. A.....St. Paul
Jesion, J. W.....St. Paul
Johanson, W. G.....St. Paul
Johnson, A. M.....St. Paul
Johnson, J. A.....St. Paul
Johnson, R. G.....St. Paul
Johnson, T. H.....San Francisco, Calif.
Jones, D. C.....St. Paul
Jones, E. M.....St. Paul

Kadesky, David ..San Francisco, Calif.
Kamman, G. R.....St. Paul
Kannary, E. L.....St. Paul
Kaplan, D. H.....St. Paul
Kasper, E. M.....St. Paul
Kelly, J. V.....St. Paul
Kelly, P. H.....St. Paul
Kenefick, E. V.....St. Paul
Kennedy, W. A.....St. Paul
Kesting, Herman .....St. Paul
King, G. L.....St. Paul
King, Z. P.....St. Paul
Klein, H. N.....St. Paul
Knauff, M. K.....St. Paul
Kugler, A. A.....St. Paul
Kvitrud, Gilbert .....St. Paul
Langenderfer, F. V.....St. Paul
Larsen, C. L.....St. Paul
Lax, M. H.....St. Paul
Leahy, Bartholomew .....St. Paul
Leavenworth, R. O.....St. Paul
Lee, S. R.....St. Paul
Leitch, Archibald .....St. Paul
Leonard, G. J.....Hastings
Lepak, J. A.....St. Paul
Lerche, William .....Cable, Wis.
Leven, N. Logan.....St. Paul
Levin, Bert.....St. Paul
Lick, C. L.....St. Paul
Lippman, H. S.....St. Paul
Little, W. J.....St. Paul
Livingstone, J. W.....Hudson, Wis.
Lowe, E. R.....South St. Paul
Lowe, T. A.....South St. Paul
Lundholm, A. M.....St. Paul
Lynch, F. W.....St. Paul
Madden, J. F.....St. Paul
Markoe, J. C.....St. Paul
Martineau, J. L.....St. Paul
Mattson, C. H.....St. Paul
McCarthy, J. J.....St. Paul
McCarthy, W. R.....St. Paul
McClanahan, J. H.....White Bear
McClanahan, T. S.....White Bear
McLaren, Jennette M.....St. Paul
McNevin, C. I.....St. Paul
Meade, J. R.....St. Paul
Mears, B. J.....St. Paul
Meyerding, E. A.....St. Paul
Moga, J. A.....St. Paul
Mogilner, S. N.....St. Paul
Molander, H. A.....St. Paul
Moquin, Marie A.....St. Paul
Moran, T. R.....St. Paul
Moriarty, Berenice.....St. Paul
Morrissey, F. B.....St. Paul
Mortenson, N. G.....St. Paul
Moss, M. N.....St. Paul
Moynihan, T. J.....St. Paul
Muller, R. T.....St. Paul
Myers, Thomas.....St. Paul
Naegeli, A. E.....St. Paul
Naslund, A. W.....St. Paul
Neher, F. H.....St. Paul
Nelson, L. A.....St. Paul
Nichols, A. E.....St. Paul
Nippert, H. T.....St. Paul
Noble, J. F.....St. Paul
Nye, Katherine A.....St. Paul
Nye, Lillian L.....St. Paul
O'Connor, L. J.....St. Paul
Oerting, Harry .....St. Paul
Ogden, Warner .....St. Paul
Ohage, Justus, Jr.....St. Paul
Olson, C. A.....St. Paul
O'Reilley, B. E.....St. Paul
Ostergren, E. W.....St. Paul
Ouelette, A. J.....St. Paul
Page, C. V.....St. Paul
Pearson, F. R.....St. Paul
Pedersen, A. H.....St. Paul
Perry, C. G.....St. Paul
Peterson, D. B.....St. Paul
Peterson, J. L. E.....St. Paul
Peterson, V. N.....St. Paul
Plondke, F. J.....St. Paul
Prendergast, H. J.....St. Paul
Prins, L. R., Jr.....St. Paul
Radabaugh, R. C.....Hastings
Ramsey, W. R.....St. Paul
Richards, E. T. F.....St. Paul
Richardson, H. E.....St. Paul
Ritchie, H. P.....St. Paul
Rogers, J. T.....St. Paul
Rogers, S. F.....St. Paul
Rosenholtz, Burton .....St. Paul
Rosenthal, Robert.....St. Paul
Rothrock, J. L.....St. Paul
Rothschild, H. J.....St. Paul
Ritt, A. E.....St. Paul
Roy, Philemon .....St. Paul
Ruhberg, G. N.....St. Paul
Rutherford, W. C.....St. Paul
Ryan, J. J.....St. Paul
Ryan, J. M.....St. Paul
Ryan, M. E.....St. Paul
Sarnecki, M. M.....St. Paul
Satterlund, V. L.....St. Paul
Savage, F. J.....St. Paul
Schoch, R. B. J.....St. Paul
Schons, Edward .....St. Paul
Schuldt, F. C.....St. Paul
Schulze, A. G.....St. Paul
Schwyzer, Arnold .....St. Paul
Scott, E. E.....St. Paul
Senkler, G. E.....St. Paul
Setzer, H. J.....St. Paul
Shellman, J. L.....St. Paul
Shillington, M. A.....St. Paul
Shimonek, S. W.....St. Paul
Short, Jacob .....St. Paul
Singer, B. J.....St. Paul
Skinner, H. O.....St. Paul
Smisek, E. A.....St. Paul
Snyder, G. W.....St. Paul
Sohlberg, O. I.....St. Paul
Souster, B. B.....St. Paul
Sprafka, J. M.....St. Paul
Steinberg, C. L.....St. Paul
Sterner, E. G.....St. Paul
Stevens, F. A.....Lake Elmo
Stewart, Alexander .....St. Paul
Stinnette, S. E.....St. Paul
Stoeckmann, A. E.....St. Paul
Stolpestad, A. H.....St. Paul
Strate, G. E.....St. Paul
Swanson, E. O.....St. Paul
Swanson, J. A.....St. Paul
Swendson, J. I.....St. Paul
Teisberg, C. B.....St. Paul
Thompson, F. A.....St. Paul
Thoreson, M. O.....St. Paul
Tifft, C. R.....St. Paul
Tregilgas, H. R.....South St. Paul
Van Slyke, C. A.....St. Paul
Veirs, Dean .....St. Paul
Veirs, Ruby S.....St. Paul
Venables, A. E.....St. Paul
Vonder Weyer, William.....St. Paul
Waas, C. W.....St. Paul
Walker, A. E.....St. Paul
Walter, C. W.....St. Paul
Warnock, R. W.....St. Paul
Warren, E. L.....St. Paul
Watz, C. E.....St. Paul
Welch, M. C.....St. Paul
Werner, O. S.....Cambridge
Wheeler, M. W.....St. Paul
Whitacre, J. C.....St. Paul
Whitmore, Frank .....St. Paul
Williams, C. K.....St. Paul
Williamson, G. A.....St. Paul
Wilson, J. A.....St. Paul
Wilson, J. V.....St. Paul
Winnick, J. B.....St. Paul
Wold, K. C.....St. Paul
Wolfe, H. H.....St. Paul
Wolff, H. J.....St. Paul
Youngren, E. R.....St. Paul
Zachman, L. L.....St. Paul
Zander, C. H.....St. Paul
Zimmermann, H. B.....St. Paul

RED RIVER VALLEY MEDICAL SOCIETY

Kittson, Mahnomen, Marshall, Norman, Pennington, Polk, Red Lake and Roseau Counties
Regular meetings, second Tuesday, April, October and December
Annual meeting, second Tuesday, December
Number of Members: 53

President
Reff, A. R.....Crookston

Secretary
Froats, C. W.....Thief River Falls

Adkins, C. M.....Thief River Falls
Adkins, G. H.....Grygla
Anderson, W. S.....Minneapolis
Berge, D. O.....Roseau
Bertelson, O. L.....Crookston
Biedermann, Jacob....Thief River Falls
Blegen, H. M.....Warren
Bohl, G. W.....Ada
Borreson, Baldwin....Thief River Falls
Bratrude, O. E.....Thief River Falls
Brown, L. L.....Crookston
Button, A. J.....Pine River
Culver, L. G.....Thief River Falls
Delmore, J. L.....Roseau
Erickson, Eskil .....Halstad
Froats, C. W.....Thief River Falls
Griffin, P. J.....Fertile
Haugseth, Enoch .....Twin Valley
Henney, W. H.....McIntosh
Hodgson, H. H.....Crookston
Holmstrom, C. H.....Warren
Holte, Halvor .....Crookston
Kirk, G. P.....East Grand Forks
Knutson, G. A.....Greenbush
Leitch, N. M.....Warroad
Locken, O. E.....Crookston
Lynde, O. G.....Thief River Falls
Melby, O. F.....Thief River Falls
Mercil, W. F.....Crookston
Morley, G. A.....Crookston
Norman, J. F.....Crookston
Ohnstad, J. L.....McIntosh
Oppegaard, C. L.....Crookston
Oppegaard, M. O.....Crookston
Paradis, W. G.....Crookston
Parsons, J. G.....Crookston
Potek, David.....Minneapolis
Reff, A. R.....Crookston
Roy, J. A.....Red Lake Falls
Shaleen, A. W.....Hallock
Shedlov, Abraham.....Fosston
Sherman, R. V.....Thief River Falls
Smith, A. M.....Thief River Falls
Sorenson, E. M.....Thief River Falls
Stocking, F. F.....Hallock
Stuurmanns, S. H.....Erskine
Swedenburg, A. W...Thief River Falls
Swedenburg, P. A....Pawnee, Nebraska
Tanglin, W. G. L.....Mahnomen
Torgerson, W. B.....Oklee
Watson, N. M.....Red Lake Falls
Weed, V. A.....Red Lake Falls
Wiltrout, I. G.....Oslo

REDWOOD-BROWN COUNTY MEDICAL SOCIETY

Annual meeting, May
Number of Members: 26

President
Goblirsch, A. P.....Sleepy Eye

Secretary
Fritsche, C. J.....New Ulm

Brey, F. W.....Wabasso
Dubbe, F. H.....New Ulm
Dysterheft, A. F.....Gaylord
Fritsche, Albert.....New Ulm
Fritsche, C. J.....New Ulm
Fritsche, T. R.....New Ulm
Gibbons, F. C.....Comfrey
Goblirsch, A. P.....Sleepy Eye
Hammermeister, T. F.....New Ulm
Hovde, Rolf.....Winthrop
Jamieson, Earl.....Walnut Grove
Just, H. J.....Lafayette
Kolset, C. D.....Sanborn
Kusske, A. L.....New Ulm
Nuessle, W. G.....Springfield
Olson, K. L.....Gibbon
Peterson, R. A.....Vesta
Reineke, G. F.....New Ulm
Rothenburg, J. C.....Springfield
Saffert, C. A.....New Ulm
Seifert, O. J.....New Ulm
Shrader, J. S.....Jordan
Vogel, H. A. L.....New Ulm
Vogel, J. H.....New Ulm
Weiser, G. B.....New Ulm
Wohlrabe, E. J.....Springfield

RENVILLE COUNTY MEDICAL SOCIETY

Regular meeting, first Tuesday of each month
Annual meeting, first Tuesday of November
Number of Members: 20

President
Passer, A. A. ..... Olivia

Secretary
Dordal, J. ..... Sacred Heart

Adams, R. C. ..... Bird Island
Billings, R. E. ..... Franklin
Brand, W. A. ..... Redwood Falls
Cole, H. B. ..... Redwood Falls
Cole, J. G. ..... Redwood Falls
Cosgriff, J. A. ..... Bird Island
Dordal, J. ..... Sacred Heart
Fawcett, A. M. ..... Renville
Dummer, W. M. ..... Fairfax
Flinn, T. E. ..... Redwood Falls
Gaines, E. C. ..... Buffalo Lake
Johnson, O. H. ..... Redwood Falls
Johnson, W. E. ..... Morgan
Lenz, J. R. ..... Morton
Loenholdt, E. H. ..... Hector
Madland, R. S. ..... Fairfax
Mesker, G. H. ..... Olivia
Passer, A. A. ..... Olivia
Penhall, F. W. ..... Morton
Solsem, F. N. ..... Sacred Heart

RICE COUNTY MEDICAL SOCIETY

Regular meeting, seven or eight annually
Annual meeting, December
Number of Members: 40

President
Murdoch, J. M. ..... Faribault

Secretary
Plonske, C. J. ..... Faribault

Babcock, F. M. ..... Northfield
Beede, E. R. ..... Faribault
Davis, F. U. ..... Faribault
Dugan, L. F. ..... Faribault
Dungay, N. S. ..... Northfield
Engstrom, F. A. ..... Wanamingo
Francis, D. W. ..... Faribault
Haessly, S. B. ..... Faribault
Hamilton, Angie G. S. .. Philadelphia, Pa.
Hanson, A. M. ..... Faribault
Haynes, A. L. ..... Faribault
Huxley, F. R. ..... Faribault
Kanne, C. W. ..... Faribault
Kucera, S. T. ..... Lonsdale
Lende, Norman ..... Faribault
Lexa, F. J. ..... Lonsdale
Lufkin, C. D. ..... Northfield
Mayland, M. L. ..... Faribault
McKeon, J. O. ..... Montgomery
Meyer, F. C. ..... Kenyon
Meyer, P. F. ..... Faribault
Moses, Joseph, Jr. ..... Northfield
Moses, R. R. ..... Kenyon
Murdoch, J. M. ..... Faribault
Nuetzman, A. W. ..... Faribault
Plonske, C. J. ..... Faribault
Robilliard, C. M. ..... Faribault
Rohrer, C. A. ..... Waterville
Rudie, C. N. ..... Kenyon
Rumpf, C. W. ..... Faribault
Rumpf, W. H. ..... Faribault
Seeley, I. F. ..... Northfield
Stewart, Gwendolyn ..... Faribault
Thorson, O. P. ..... Northfield
Traeger, C. A. ..... Faribault
Warren, F. S. ..... Washington, D. C.
Wilkowske, R. J. ..... Nerstrand
Wilson, Warren ..... Northfield
Wilson, W. E. ..... Northfield
Wylie, A. R. T. ..... Faribault

ST. LOUIS COUNTY MEDICAL SOCIETY

Carlton, Cook, Itasca, Lake and St. Louis Counties
Regular meeting, second Thursday every month
Annual meeting, December
Number of Members: 177

President
Klein, Harry ..... Duluth

Secretary
Gillespie, M. G. ..... Duluth

Adams, B. S. ..... Hibbing
Addy, E. R. ..... Gilbert
Akins, W. M. ..... Eveleth
Armstrong, E. L. ..... Duluth
Athens, A. G. ..... Duluth
Ayres, G. T. ..... Ely
Bagley, Elizabeth C. ..... Duluth
Bagley, W. R. ..... Duluth
Bardon, Richard ..... Duluth
Barney, L. A. ..... Duluth
Berdez, G. L. ..... Duluth
Bianco, A. J. ..... Duluth
Binet, H. E. ..... Grand Rapids
Blacklock, S. S. ..... Hibbing
Blakely, C. C. ..... Barnum
Boman, P. G. ..... Duluth
Bowen, R. L. ..... Hibbing
Boyer, S. H., Jr. ..... Duluth
Boyer, S. H., Sr. ..... Duluth
Braverman, N. J. ..... Duluth
Bray, C. W. ..... Biwabik
Bray, P. N. ..... Duluth
Burns, R. L. ..... Two Harbors
Cantwell, W. F. ..... International Falls
Carstens, C. F. ..... Hibbing
Chapman, T. L. ..... Duluth
Cheney, E. L. ..... Duluth
Christensen, E. P. ..... Two Harbors
Clement, T. G. ..... Duluth
Clark, F. F. ..... Duluth
Collins, A. N. ..... Duluth
Collins, H. C. ..... Duluth
Coventry, W. A. ..... Duluth
Davis, B. F. ..... Duluth
Doolittle, L. E. ..... Duluth
Doyle, G. C. ..... Duluth
Drenning, F. C. ..... Duluth
Eckman, P. F. ..... Duluth
Eckman, R. J. ..... Duluth
Ekblad, J. W. ..... Duluth
Elias, F. J. ..... Duluth
Emanuel, K. W. ..... Duluth
Eppard, R. M. ..... Cloquet
Estrem, T. A. ..... Hibbing
Ewens, H. B. ..... Virginia
Fankboner, A. V. ..... Mountain Iron
Fawcett, K. R. ..... Duluth
Fellows, M. F. ..... Duluth
Feuling, J. C. ..... Bovey
Fiala, M. J. ..... Duluth
Fischer, M. McC. ..... Duluth
Folker, L. W. ..... Proctor
Forbes, R. S. ..... Duluth
Garrow, D. M. ..... Rochester
Gillespie, M. G. ..... Duluth
Gillespie, N. H. ..... Duluth
Goldish, D. R. ..... Duluth
Goodman, C. E. ..... Virginia
Gowan, L. R. ..... Duluth
Graham, Robert ..... Duluth
Graves, W. N. ..... Duluth
Hall, A. E. ..... Virginia
Haney, C. L. ..... Duluth
Harris, C. N. ..... Nashwauk
Hatch, W. E. ..... Duluth
Hathaway, S. J. ..... Proctor
Hayes, M. F. ..... Nashwauk
Hedberg, G. A. ..... Nopeming
Heiam, W. C. ..... Cook
Heimark, O. E. ..... Duluth
Hilding, A. C. ..... Duluth
Hill, F. E. ..... Duluth
Hirschboeck, F. J. ..... Duluth
Hirschfield, M. S. ..... Duluth
Hoff, H. O. ..... Duluth
Jacobson, Clarence ..... Chisholm
Jensen, T. J. ..... Duluth
Jolin, F. M. ..... Grand Rapids
Jolin, R. V. ..... Grand Rapids
Karleen, P. E. ..... Spring Valley
Keyes, C. R. ..... Duluth
Klein, Harry ..... Duluth
Knapp, F. N. ..... Duluth
Kohlbry, C. O. ..... Duluth
Kotchevar, F. R. ..... Eveleth
Kraft, Peter ..... Duluth
Krantz, C. I. ..... Duluth
Kuth, J. R. ..... Duluth
Laird, A. T. ..... Nopeming
Lenont, C. B. ..... Virginia
Lepak, F. J. ..... Duluth
Litman, S. N. ..... Duluth
Loofbourrow, E. H. ..... Keewatin
Lundquist, C. W. ..... Coleraine
MacRae, G. C. ..... Duluth
Magney, F. H. ..... Duluth
Malmstrom, J. A. ..... Virginia
Manley, J. R. ..... Duluth
Martin, E. T. ..... Duluth
Martin, W. C. ..... Duluth
Mayne, R. M. ..... Duluth
McCarty, P. D. ..... Ely
McComb, C. F. ..... Duluth
McCoy, Mary K. ..... Duluth
McDaniel, S. P. ..... Mountain Iron
McDonald, A. L. ..... Duluth
McHaffie, O. L. ..... Duluth
McLeod, J. L. ..... Grand Rapids
McNutt, J. R. ..... Duluth
Mead, C. H. ..... Duluth
Merriman, L. L. ..... Duluth
Moe, R. J. ..... Duluth
Moe, Thomas ..... Moose Lake
Monroe, P. B. ..... Two Harbors
More, C. W. ..... Eveleth
Morsman, L. W. ..... Hibbing
Morss, C. R. ..... Zumbrota
Mueller, Selma C. ..... Duluth
Nelson, E. H. ..... Chisholm
Nelson, R. L. ..... Duluth
Nicholson, M. A. ..... Duluth
Nutting, R. E. ..... Duluth
Olson, A. E. ..... Duluth
Parker, O. W. ..... Ely
Pennie, D. F. ..... Duluth
Peterson, E. N. ..... Eveleth
Peterson, J. H. ..... Duluth
Power, J. E. ..... Duluth
Raadquist, C. S. ..... Hibbing
Raiter, F. W. S. ..... Cloquet
Raiter, R. F. ..... Cloquet
Robinson, J. M. ..... Duluth
Rood, D. C. ..... Hibbing
Rowe, O. W. ..... Duluth
Rudie, P. S. ..... Duluth
Ryan, W. J. ..... Duluth
Sach-Rowitz, Alvin ..... Moose Lake
Salter, R. A. ..... Virginia
Sarff, O. E. ..... Buhl
Scherer, C. A. ..... Duluth
Schroder, C. H. ..... Duluth
Seashore, R. T. ..... Duluth
Shapiro, E. Z. ..... Duluth
Shastid, T. H. ..... Duluth
Shaw, A. W. ..... Buhl
Sinamark, Andrew ..... Hibbing
Sisler, C. E. ..... Grand Rapids
Slyfield, F. F. ..... Duluth
Smith, C. M. ..... Duluth
Smith, W. R. ..... Grand Marais
Spicer, F. W. ..... Duluth
Spurbeck, R. G. ..... Cloquet
Steffens, L. F. ..... Hibbing
Strathern, M. L. ..... Gilbert
Strobel, W. G. ..... Duluth
Stuart, A. B. ..... Cloquet
Sukeforth, L. A. ..... Duluth
Sutherland, H. N. ..... Ely
Swanson, P. E. ..... Virginia
Swenson, A. O. ..... Duluth
Taylor, C. W. ..... Duluth
Tibbetts, M. H. ..... Duluth
Tilderquist, D. L. ..... Duluth
Tuohy, E. L. ..... Duluth
Urberg, S. E. ..... Duluth
Vercellini, C. E. ..... Duluth
Walker, A. E. ..... Duluth
Wallace, M. O. ..... Duluth
Webber, E. E. ..... Duluth
West, E. J. ..... Duluth
Wheeler, D. W. ..... Duluth
Wilkinson, Stella L. ..... Duluth
Wingquist, C. G. ..... Carlton
Winter, J. A. ..... Duluth
Young, T. O. ..... Duluth
Young, V. A. ..... Duluth
Zlatovski, Michael ..... Duluth

ROSTER MINNESOTA STATE MEDICAL ASSOCIATION

SCOTT-CARVER COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday of the month
Annual meeting, second Tuesday, June
Number of Members: 27

President
Phillips, W. H. ..... Jordan

Secretary
Crow, E. R. ..... Arlington

Buck, F. H. ..... Shakopee
Cervenka, C. F. ..... New Prague
Crow, E. R. ..... Arlington
Eklund, E. J. ..... Norwood
Emmerson, W. S. ..... Mayer
Fischer, H. P. ..... Shakopee
Havel, H. W. ..... Shakopee
Hebeisen, M. B. ..... Chaska
Henriksen, H. G. ..... Elko
Juergens, H. M. ..... Belle Plaine
Lightbourn, E. T. ..... Jordan
Maertz, W. F. ..... New Prague
Martin, T. P. ..... Arlington
Nagel, H. D. ..... Waconia
Novak, E. E. ..... New Prague
Olson, C. J. ..... Belle Plaine
Ormond, D. T. ..... Waconia
Pearson, B. F. ..... Shakopee
Phillips, W. H. ..... Jordan
Pogue, R. E. ..... Watertown
Reiter, H. W. ..... Shakopee
Schimelpfenig, G. T. ..... Chaska
Simons, B. H. ..... Chaska
Westerman, A. E. ..... Montgomery
Westerman, F. C. ..... Montgomery
Woodworth, L. F. ..... Le Center
Wunder, H. E. ..... Shakopee

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

Cottonwood, Jackson, Murray, Nobles, Pipestone, and Rock Counties
Regular meetings, Spring and Fall
Annual meeting, usually November
Number of Members: 57

President
Stanley, C. R. ..... Worthington

Secretary
DeBoer, Hermanus ..... Edgerton

Arnold, E. W. ..... Adrian
Basinger, H. P. ..... Windom
Basinger, H. R. ..... Mountain Lake
Benjamin, W. G. ..... Pipestone
Bofenkamp, F. W. ..... Luverne
Bong, J. H. ..... Jasper
Brown, A. H. ..... Pipestone
Carlson, J. V. ..... Westbrook
Chadbourn, A. G. ..... Heron Lake
Chunn, S. S. ..... Pipestone
Clark, H. H. ..... Edgerton
Cress, P. J. ..... Ellsworth
DeBoer, Hermanus ..... Edgerton
Ditmeier, Louise M. G. ..... Jasper
Dolan, C. P. ..... Worthington
Doms, H. C. ..... Slayton
Dudley, J. H. ..... Windom
Engh, Sigfred ..... Jackson
Halloran, W. H. ..... Jackson
Halpern, D. J. ..... Brewster
Harrison, P. W. ..... Worthington
Johnson, R. E. ..... Worthington
Kendahl, A. M. ..... Jasper
Kilbride, E. A. ..... Worthington
Larson, J. T. ..... Lake Wilson
Lindahl, M. J. ..... Jasper
Lowe, Thomas ..... Pipestone
Maitland, D. P. ..... Jackson
Maitland, E. T. ..... Jackson
Manson, F. M. ..... Worthington
McCrea, J. M. ..... Fulda
McKeown, E. G. ..... Pipestone
Mork, B. O., Jr. ..... Worthington
Mork, B. O. ..... Worthington
Pankratz, P. J. ..... Mountain Lake
Patterson, W. E. ..... Westbrook
Pertl, A. L. ..... Windom
Piper, W. A. ..... Mountain Lake
Portmann, W. C. ..... Jackson
Priest, R. E. ..... Worthington
Richmond, C. D. ..... Jeffers
Rose, J. T. ..... Lakefield
Ross, W. P. ..... Worthington
Schutz, E. S. ..... Mountain Lake
Sherman, C. L. ..... Luverne
Slater, S. A. ..... Worthington
Sogge, L. L. ..... Windom
Stanley, C. R. ..... Worthington
Stevenson, B. M. ..... Fulda
Stratte, H. C. ..... Windom
Tofte, Josephine ..... Dawson
Thorson, E. O. ..... Luverne
Waller, J. D. ..... Wilmont
Williams, A. B. ..... St. Paul
Williams, C. A. ..... Pipestone
Williams, L. A. ..... Slayton
Wright, C. O. ..... Luverne

STEARNS-BENTON COUNTY MEDICAL SOCIETY

Regular meetings, third Thursday of the month
Annual meeting, third Thursday of December
Number of Members: 35

President
Kohler, D. W. ..... St. Joseph

Secretary
Libert, J. N. ..... St. Cloud

Beuning, J. B. ..... Albany
Clark, H. B. ..... St. Cloud
DuBois, J. A. ..... Sauk Center
DuBois, J. F. ..... Sauk Center
Engstrom, G. F. ..... Belgrade
Freeman, W. L. ..... St. Cloud
Friesleben, William ..... Sauk Rapids
Gaida, J. B. ..... St. Cloud
Gelz, J. J. ..... St. Cloud
Goehrs, H. W. ..... St. Cloud
Haberman, Emil ..... Osakis
Hemstead, Werner ..... St. Cloud
Kettlewell, R. B. ..... Sauk Center
Kuhlmann, August ..... Melrose
Johnson, Walfred ..... Sauk Center
Jones, R. N. ..... St. Cloud
Kohler, D. W. ..... St. Joseph
Koop, S. H. ..... Richmond
Lewis, C. B. ..... St. Cloud
Libert, J. N. ..... St. Cloud
Mahowald, A. ..... Albany
McDowell, J. P. ..... St. Cloud
Meyer, A. A. ..... Melrose
Moynihan, A. F. ..... Sauk Center
Rathbun, C. A. ..... St. Cloud
Richards, W. B. ..... St. Cloud
Ridgway, Alexander ..... South Haven
Rydburg, W. C. ..... Brooten
Schatz, F. J. ..... St. Cloud
Sherwood, G. E. ..... Kimball
Stangl, Fred ..... St. Cloud
Stangl, P. E. ..... St. Cloud
Sutton, C. S. ..... St. Cloud
Wenner, W. T. ..... St. Cloud
Zachman, A. H. ..... Melrose

STEELE COUNTY MEDICAL SOCIETY

Regular meetings, Monthly
Annual meeting, December
Number of Members: 17

President
Berghs, L. V. ..... Owatonna

Secretary
Schaefer, J. F. ..... Owatonna

Berghs, L. V. ..... Owatonna
Carlson, V. W. ..... Blooming Prairie
Dewey, D. H. ..... Owatonna
Ertel, E. Q. ..... Ellendale
Farabaugh, C. L. ..... Owatonna
Flores, O. T. ..... Dodge Center
Kreuzer, T. C. ..... Owatonna
McEnaney, C. T. ..... Owatonna
McIntyre, J. A. ..... Owatonna
Melby, Benedik ..... Blooming Prairie
Morehead, D. E. ..... Owatonna
Nelson, E. J. ..... Owatonna
Roberts, O. W. ..... Owatonna
Schaefer, J. F. ..... Owatonna
Senn, E. W. ..... Owatonna
Smersh, J. F. ..... Owatonna
Stewart, A. B. ..... Owatonna

UPPER MISSISSIPPI MEDICAL SOCIETY

Aitkin, Beltrami, Cass, Clearwater, Crow Wing, Hubbard, Koochiching,
Lake of the Woods, Morrison, Todd and Wadena Counties
Regular meetings, Spring, Summer, Fall
Annual meeting, January
Number of Members: 84

President
Watson, A. M. ..... Royalton

Secretary
Badeaux, G. I. ..... Brainerd

Anderson, C. E. ..... Brainerd
Badeaux, G. I. ..... Brainerd
Beise, R. A. ..... Brainerd
Borgerson, A. H. ..... Sebeka
Bosland, H. G. ..... Verndale
Bowers, J. T. ..... Bemidji
Brink, A. A. ..... Baudette
Burns, H. A. ..... Ah-Gwah-Ching
Campbell, R. W. ..... Cass Lake
Cardle, G. E. ..... Ah-Gwah-Ching
Carlson, C. E. ..... Aitkin
Christie, G. R. ..... Long Prairie
Christie, R. L. ..... Long Prairie
Cook, J. M. ..... Staples
Corrigan, J. E. ..... Spooner
Davis, L. T. ..... Wadena
Davis, T. C. ..... Wadena
Fait, R. V. ..... Little Falls
Feldman, F. M. ..... Minneapolis
Frost, H. T. ..... Wadena
Garlock, A. V. ..... Bemidji
Garlock, D. H. ..... Bemidji
Gerber, M. P. ..... Brainerd
Ghostley, Mary C. ..... Puposky
Gifford, B. L. ..... Long Prairie
Grawn, F. A. ..... Northome
Grogan, J. S. ..... Wadena
Groschupf, T. P. ..... Bemidji
Grose, F. N. ..... Clarissa
Hanover, R. D. ..... Littlefork
Hanson, E. C. ..... Park Rapids
Hawkinson, J. P. ..... Crosby
Hawkinson, L. F. ..... Brainerd

Healy, R. T.....Pierz
Hendrickson, R. R.....Wadena
Higgs, W. W.....Park Rapids
Holst, C. F.....Litttle Falls
Holst, J. B.....Litttle Falls
Holt, G. W.....Lake City
House, Z. E.....Cass Lake
Hubbard, O. E.....Brainerd
Hubin, E. G.....Deerwood
Jacobson, D. J.....Blackduck
Johnson, C. E.....Pine River
Johnson, E. W.....Bemidji
Johnson, V. E.....Walker
Kelly, B. W.....Aitkin
Kerlan, Irvin .....McGregor
Kerlan, S. Z.....Aitkin
Lamb, H. L.....Little Falls
Laney, R. L.....Fertile
Larson, L. J.....Bagley
Larson, L. M.....Oak Terrace
Laughlin, J. T.....Grey Eagle
Marcum, E. H.....Bemidji
Mark, Hilbert.....Ah-Gwah-Ching
Mason, J. A.....International Falls
McCann, D. F.....Bemidji
Mosby, M. E.....Long Prairie
Moyer, R. E.....Fort Snelling
Nelson, Nesmith .....Brainerd
Osburn, B. F.....International Falls
Petraborg, H. T.....Aitkin
Pierce, C. H.....Wadena
Quanstrom, V. E.....Brainerd
Reichelderfer, C. F.....Staples
Ringle, O. F.....Walker
Roberts, L. M.....Little Falls
Rosenfield, A. B.....Pequot
Shannon, S. S.....Crosby
Simons, E. J.....Ah-Gwah-Ching
Simons, J. B.....Swanville
Smith, B. A.....Crosby
Spurzem, Clementine...Ah-Gwah-Ching
Stein, R. J.....Pierz
Stevens, John .....Gonvick
Thabes, J. A., Jr.....Brainerd
Thabes, J. A., Sr.....Brainerd
Watson, A. M.....Royalton
Watson, P. T.....Cass Lake
Watson, W. J.....Holdingford
Will, W. W.....Bertha
Wilson, V. A.....Ah-Gwah-Ching
Withrow, M. E.....International Falls

WABASHA COUNTY MEDICAL SOCIETY

Annual meeting, first Thursday after first Monday in July
Number of Members: 11

President
Ochsner, C. G.....Wabasha

Secretary
Wilson, W. F.....Lake City

Bayley, E. C.....Lake City
Bouquet, B. J.....Wabasha
Cochrane, W. J.....Lake City
Collins, J. S.....Wabasha
Fleischauer, D. S.....Wabasha
Flesche, B. A.....Lake City
Frost, R. H.....Wabasha
Ochsner, C. G.....Wabasha
Sherman, H. T.....Plainview
Slocumb, J. A.....Plainview
Wilson, W. F.....Lake City

WASECA COUNTY MEDICAL SOCIETY

Regular meetings, at call of President
Annual meeting, December
Number of Members: 9

President
Oeljen, S. C. G.....Waseca

Secretary
Hottinger, R. C.....Janesville

Bernstein, W. C.....New Richland
Chadbourn, C. R.....Janesville
Gallagher, B. J.....Waseca
Hottinger, R. C.....Janesville
Lynn, J. F.....Waseca
McIntire, H. M.....Waseca
Oeljen, S. C. G.....Waseca
Olds, G. H.....Waseca
Swenson, O. J.....Waseca

WASHINGTON COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday in January, February, March, April, May, September, October, November and December
Annual meeting second Tuesday in December
Number of Members: 16

President
Brooks, G. F.....Stillwater

Secretary
Boleyn, E. S.....Stillwater

Boleyn, E. S.....Stillwater
Brekke, H. J.....Minneapolis

Brooks, G. F.....Stillwater
Buckley, C. H.....Stillwater
Ewald, R. P.....Newport
Haines, J. H.....Stillwater
Humphrey, W. R.....Stillwater
Josewski, R. J.....Stillwater
Kalinoff, D. .....Stillwater
Linner, Gunnar .....Stillwater
Mingo, F. E.....Hugo
Poirier, J. A.....Forest Lake
Ruggles, G. McC.....Forest Lake
Strand, E. V.....Bayport
Stuhr, J. W.....Stillwater
Van Meier, Henry .....Stillwater

WATONWAN COUNTY MEDICAL SOCIETY

Regular meeting, at call
Annual meeting, December
Number of Members: 7

President
Bergman, O. B.....St. James

Secretary
Grimes, H. B.....Madelia

Bergman, O. B.....St. James
Bratrude, E. J.....St. James
Bregel, F. L.....St. James
Grimes, H. B.....Madelia
Hagen, O. E.....Butterfield
McCarthy, W. J.....Madelia
Thompson, Albert .....St. James

WEST CENTRAL MINNESOTA MEDICAL SOCIETY

Big Stone, Pope, Stevens and Traverse Counties
Regular meetings, January, April and June
Annual meeting, October
Number of Members: 24

President
Cumming, J. F.....Morris

Secretary
Nelson, M. C.....Lowry

Arneson, A. I.....Morris
Bates, B. V.....Browns Valley
Bergan, Otto .....Clinton
Bolsta, Charles .....Ortonville

Caine, C. E.....Morris
Cumming, J. F.....Morris
Doleman, N. F.....Tintah
Eberlin, E. A.....Glenwood
Elsey, E. M.....Glenwood
Elsey, J. R.....Glenwood
Ewing, C. F.....Wheaton
Fitzgerald, E. T.....Morris
Giesen, A. F.....Starbuck
Karn, B. R.....Ortonville
Leland, J. T.....Herman
Lindberg, A. L.....Wheaton
Linde, Herman .....Cyrus
McIver, B. A.....Lowry
McKenna, M. J.....Graceville
Nelson, M. C.....Lowry
Oliver, C. I.....Graceville
Oliver, I. L.....Graceville
Ransom, M. L.....Hancock
Shelver, H. J.....Ortonville

WINONA COUNTY MEDICAL SOCIETY

Regular meetings, first Monday Quarterly
Annual meeting, first Monday in January
Number of Members: 25

President
Younger, L. I.....Winona

Secretary
Steiner, I. W.....Winona

Benoit, F. T.....Winona
Christensen, E. E.....Winona
Clay, F. H.....St. Charles
Heise, W. F. C.....Winona
Keyes, J. D.....Winona

Lichtenstein, H. .....Winona
Lindsay, W. V.....Winona
Mattison, P. A.....Winona
McLaughlin, E. M.....Winona
Meinert, A. E.....Winona
Nauth, W. W.....Winona
Neumann, C. A.....Winona
Page, R. L.....St. Charles
Risser, E. D.....Winona
Robbins, C. P.....Winona
Roth, F. D.....Lewiston
Satterlee, H. W.....Lewiston
Schaefer, S.....Winona
Steiner, I. W.....Winona
Tweedy, G. I.....Winona
Tweedy, R. B.....Winona
Walker, G. H.....Winona
Wilson, R. H.....Winona
Younger, L. I.....Winona
Zintek, A. R.....Winona

WRIGHT COUNTY MEDICAL SOCIETY

Regular meeting, Quarterly
Annual meeting, first Tuesday after first Monday in October
Number of Members: 19

President
*Johnson, V. P.....Delano

Secretary
Catlin, J. J.....Buffalo

Anderson, W. P.....Buffalo

*Deceased.

Bendix, L. H.....Annandale
Catlin, J. J.....Buffalo
Catlin, T. J.....Buffalo
Ellison, F. E.....Monticello
Grundset, O. J.....Montrose
Harriman, L.....Howard Lake
Hart, W. E.....Monticello
Hoyer, L. J.....Howard Lake
*Johnson, V. P.....Delano
Lee, J. L.....Watertown
Olson, J. W.....Cokato
Peterson, O. L.....Cokato
Phillips, A. E.....Delano
Ridgway, A. M.....Annandale
Roholt, C. L.....Waverly
Rousseau, Victor .....Maple Lake
Swezey, B. F.....Buffalo
Thompson, Arthur .....Cokato

ALPHABETIC ROSTER

Aanes, A. M.....Red Wing
Abbott, J. S.....St. Paul
Aborn, W. H.....Hawley
Adams, B. S.....Hibbing
Adams, R. C.....Bird Island
Addy, E. R.....Gilbert
Adkins, C. M.....Thief River Falls
Adkins, G. H.....Grygla
Adson, A. W.....Rochester
Ahrens, A. E.....St. Paul
Ahrens, A. H.....St. Paul
Ahrens, R. S.....Minneapolis
Aitkens, H. B.....Le Center
Akins, W. M.....Eveleth
Alberts, M. W.....St. Paul
Alden, J. F.....St. Paul
Alexander, F. H.....St. Paul
Alexander, H. A.....Minneapolis
Aling, C. A.....Minneapolis
Allen, A. W.....Austin
Allen, C. C.....Austin
Allen, E. V.....Rochester
Allen, H. W.....Minneapolis
Allison, R. G.....Minneapolis
Altnow, H. O.....Minneapolis
Alvarez, W. C.....Rochester
Amberg, Samuel.....Rochester
Andersen, A. G.....Minneapolis
Andersen, S. C.....Minneapolis
Anderson, C. E.....Brainerd
Anderson, C. M.....Rochester
Anderson, D. D.....Minneapolis
Anderson, E. D.....Minneapolis
Anderson, E. R.....Minneapolis
Anderson, F. J.....Minneapolis
Anderson, J. K.....Minneapolis
Anderson, K. W.....Minneapolis
Anderson, M. J.....Rochester
Anderson, N. E.....Harmony
Anderson, N. H.....Spring Valley
Anderson, P. A.....Minneapolis
Anderson, R. E.....Willmar
Anderson, S. H.....Red Wing
Anderson, U. S.....Austin
Anderson, W. P.....Buffalo
Anderson, W. S.....Minneapolis
Andreassen, E. C.....Minneapolis
Andrews, R. N.....Mankato
Andrews, R. S.....Minneapolis
Annis, H. B.....Minneapolis
Annis, J. W.....Rochester
*Archibald, F. M.....Mahnomen
Arends, A. L.....Askov
Arey, S. L.....Excelsior
Arlander, C. E.....Minneapolis
Armstrong, E. L.....Duluth
Armstrong, J. M.....St. Paul
Armstrong, T. D.....Rochester
Arndt, H. W.....Frazee
Arneson, A. I.....Morris
Arnold, D. C.....Minneapolis
Arnold, E. W.....Adrian
Arnquist, A. S.....St. Paul
Arnson, J. M.....Benson
Arvidson, C. G.....Minneapolis
Athens, A. G.....Duluth
Aune, Martin.....Minneapolis
Aurand, W. H.....Minneapolis
Aurelius, J. R.....St. Paul
Ausman, C. F.....St. Paul
Avery, J. F.....Minneapolis
Ayres, G. T.....Ely

Babcock, F. M.....Northfield
Backus, A. S.....St. Paul
Bacon, D. K.....St. Paul
Bacon, L. C.....St. Paul
Bacon, R. S.....Montevideo
Badeaux, G. I.....Brainerd
Baggenstoss, A. H.....Rochester
Bagley, Elizabeth C.....Duluth
Bagley, W. R.....Duluth
Bailey, H. B.....Fairmont
Bailey, R. J.....Rochester
Bair, H. L.....Rochester
Baird, L. W.....Rochester
Baken, M. P.....Minneapolis
Baker, A. C.....Fergus Falls
Baker, A. T.....Minneapolis
Baker, C. P.....Rochester
Baker, E. L.....Minneapolis
Baker, G. S.....Rochester
Baker, H. R.....Hayfield
Baker, Looe.....Minneapolis
Baker, N. H.....Fergus Falls
Baker, T. W.....Rochester
Balfour, D. C.....Rochester
Bannick, E. G.....Rochester
Barber, J. P.....Minneapolis
Bardon, Richard.....Duluth
Bargen, J. A.....Rochester
Barker, N. W.....Rochester
Barnes, A. R.....Rochester
Barney, L. A.....Duluth
Barr, I. C.....Albert Lea
Barr, W. H.....Wells
Barron, Moses.....Minneapolis
Barry, L. W.....St. Paul
Barsness, Nellie.....St. Paul
Basinger, H. P.....Windom
Basinger, H. R.....Mountain Lake
Bass, G. W.....Minneapolis
Bates, B. V.....Browns Valley
Baxter, S. H.....Minneapolis
Bayard, H. F.....Minneapolis
Bayley, E. C.....Lake City
Beadie, W. D.....Cannon Falls
Beals, Hugh.....St. Paul
Beard, A. H.....Minneapolis
Beard, R. O.....Minneapolis
Beckman, W. G.....Minneapolis
Bedard, R. E.....Rochester
Bedford, E. W.....Minneapolis
Beede, Ethel R.....Faribault
Beek, H. O.....St. Paul
Behmler, F. W.....Appleton
Behrend, Albert.....Rochester
Beise, R. A.....Brainerd
Beiswanger, R. H.....Wykoff
Bell, C. C.....St. Paul
Bell, E. T.....Minneapolis
Belote, G. B.....Caledonia
Bendix, L. H.....Annandale
Benedict, W. L.....Rochester
Benepe, J. L.....St. Paul
Benham, E. W.....Mankato
Benjamin, A. E.....Minneapolis
Benjamin, E. G.....Minneapolis
Benjamin, W. G.....Pipestone
Benn, F. G.....Minneapolis
Bennion, P. H.....St. Paul
Benoit, F. T.....Winona
Bentley, N. P.....St. Paul
Berdez, G. L.....Duluth
Bergan, Otto.....Clinton
Berge, D. O.....Roseau
Berger, A. G.....Minneapolis
Bergh, L. N.....Montevideo
Bergheim, M. C.....Hawley
Berghs, L. V.....Owatonna
Bergman, O. B.....St. James
Bergquist, K. E.....Battle Lake
Berkman, D. M.....Rochester
Berkman, J. M.....Rochester
Berkwitz, N. J.....Minneapolis
Bernstein, W. C.....New Richland
Berrisford, P. D.....St. Paul
Bertelson, O. L.....Crookston
Bessesen, A. N., Jr.....Minneapolis
Bessesen, D. H.....Minneapolis
Bessesen, W. A.....Minneapolis
Betlach, C. J.....Rochester
Beuning, J. B.....Albany
Bianco, A. J.....Duluth
Bicek, J. F.....St. Paul
Biedermann, Jacob....Thief River Falls
Bigelow, C. E.....Dodge Center
Billings, R. E.....Franklin
Binet, H. E.....Grand Rapids
Binger, H. E.....St. Paul
Binger, M. W.....Rochester
Birnberg, T. L.....St. Paul
Black, William.....Mankato
Blacklock, S. S.....Hibbing
Blake, James.....Hopkins
Blake, T. W.....Rochester
Blakely, C. C.....Barnum
Blakey, A. R.....Osakis
Blanchard, H. G.....Fairmont
Blaustone, H. H.....Minneapolis
Blegen, H. M.....Warren
Blomberg, W. R.....Princeton
Blum, B. B.....Rochester
Blumenthal, J. S.....Columbia Heights
Bock, R. A.....St. Paul
Bockman, M. W. H.....Minneapolis
Boeckmann, Egil.....St. Paul
Bofenkamp, F. W.....Luverne
Bohl, G. W.....Ada
Bohland, E. H.....St. Paul
Boies, L. R.....Minneapolis
Bolender, H. L.....St. Paul
Boleyn, E. S.....Stillwater
Boline, C. A.....Battle Lake
Bolsta, Charles.....Ortonville
Boman, P. G.....Duluth
Bong, J. H.....Jasper
Booth, A. E.....Minneapolis
Boothby, W. M.....Rochester
Borg, J. F.....St. Paul
Borgerson, A. H.....Sebeka
Borgeson, E. J.....Minneapolis
Borreson, Baldwin....Thief River Falls
Bosland, H. G.....Verndale
Bossert, C. S.....Mora
Bossingham, O. N.....Lake Benton
Bouma, L. R.....St. Paul
Bouman, H. A. H.....Minneapolis
Bouquet, B. J.....Wabasha
Bowen, R. L.....Hibbing
Bowers, J. T.....Bemidji
Bowing, H. H.....Rochester
Boyd, L. M.....Alexander
Boyer, S. H., Jr.....Duluth
Boyer, S. H., Sr.....Duluth
Boynton, Ruth.....Minneapolis
Boysen, Herbert.....Welcome
Boysen, Peter.....Pelican Rapids
Braasch, W. F.....Rochester
Bracken, H. M.....Claremont, Calif.
Brand, G. D.....St. Paul
Brand, W. A.....Redwood Falls
Branham, D. S.....Albert Lea
Branton, A. F.....Willmar
Branton, B. J.....Willmar
Bratrud, A. F.....Minneapolis
Bratrud, O. E.....Thief River Falls
Bratrude, E. J.....St. James
Braverman, N. J.....Duluth
Bray, C. W.....Biwabik
Bray, E. R.....St. Paul
Bray, P. N.....Duluth
Bregel, F. L.....St. James
Brekke, H. J.....Minneapolis
Brey, F. W.....Wabasso
Briggs, J. F.....St. Paul
Brigham, Frank.....Watkins
Brink, A. A.....Baudette
Brink, J. R.....Rochester
Brodie, W. D.....St. Paul
Broker, W. S.....Battle Lake
Brooks, C. N.....Minneapolis
Brooks, G. F.....Stillwater
Brown, A. E.....Rochester
Brown, A. H.....Pipestone
Brown, E. D.....Minneapolis
Brown, E. I.....St. Paul
Brown, E. J.....Minneapolis
Brown, J. C.....St. Paul
Brown, L. L.....Crookston
Brown, P. W.....Rochester
Brown, R. W.....Cambridge
Brownstone, Manuel.....Sandstone
Brunsting, H. A.....Rochester
Brunsting, L. A.....Rochester
Brusegard, J. F.....Red Wing
Bryant, O. R.....Minneapolis
Buchstein, H. F.....Rochester
Buchtel, H. A.....Rochester
Buck, F. H.....Shakopee
Buckley, C. H.....Stillwater
Buie, L. A.....Rochester
Bulinski, T. J.....St. Paul
Bulkley, Kenneth.....Minneapolis
Bullard, Mattie J.....Minneapolis
Burch, F. E.....St. Paul
Burch, H. A.....Rochester
Burnap, W. L.....Fergus Falls
Burns, H. A.....Ah-Gwah-Ching
Burns, H. D.....Albert Lea
Burns, L. S.....So. St. Paul
Burns, M. A.....Milan
Burns, R. L.....St. Paul
Burns, R. M.....St. Paul
Burton, C. G.....St. Paul
Busher, H. H.....St. Paul
Butler, John.....Minneapolis
Butsch, W. L.....Rochester
Butt, H. R.....Rochester
Button, A. J.....Pine River
Butturff, C. R.....Freeborn
Butzer, J. A.....Mankato
Buzzelle, L. K.....Minneapolis

Cable, M. L.....Minneapolis
Cabot, Hugh.....Rochester
Cabot, V. S.....Minneapolis
Cady, L. H.....Minneapolis
Caine, C. E.....Morris
Caldwell, J. P.....St. Paul

*Deceased

Calhoun, F. W. ..... Albert Lea
Callahan, F. F. ..... Pokegama
Callerstrom, G. W. ..... Minneapolis
Calvin, A. R. ..... St. Paul
Cameron, Isabell ..... Minneapolis
Camp, J. D. ..... Rochester
Camp, W. E. ..... Minneapolis
Campbell, J. E. ..... So. St. Paul
Campbell, L. M. ..... Minneapolis
Campbell, O. J. ..... Minneapolis
Campbell, R. W. ..... Cass Lake
Canfield, W. W. ..... Houston
Cantwell, W. F. ..... International Falls
Cardle, A. E. ..... Minneapolis
Cardle, G. E. ..... Ah-Gwah-Ching
Carey, J. B. ..... Minneapolis
Carlaw, C. M. ..... Minneapolis
Carlson, C. E. ..... Aitkin
Carlson, H. A. ..... Minneapolis
Carlson, J. B. ..... Westbrook
Carlson, Lawrence ..... Minneapolis
Carlson, L. A. ..... Rochester
Carlson, V. W. ..... Blooming Prairie
Carman, J. E. ..... Detroit Lakes
Carmichael, F. A., Jr. ..... Rochester
Caron, R. P. ..... Minneapolis
Carroll, W. C. ..... St. Paul
Carstens, C. F. ..... Hibbing
Catlin, J. J. ..... Buffalo
Catlin, T. J. ..... Buffalo
Cavanor, F. T. ..... Minneapolis
Cervenka, C. F. ..... New Prague
Chadbourn, A. G. ..... Heron Lake
Chadbourn, C. R. ..... Janesville
Chambers, W. C. ..... Blue Earth
Chapman, T. L. ..... Duluth
Chatterton, C. C. ..... St. Paul
Cheney, E. L. ..... Duluth
Cherry, C. H. ..... Minneapolis
Chesley, A. J. ..... Minneapolis
Christensen, E. E. ..... Winona
Christensen, E. P. ..... Two Harbors
Christenson, C. R. ..... Minneapolis
Christiansen, A. ..... St. Paul
Christianson, H. W. ..... Minneapolis
Christie, G. R. ..... Long Prairie
Christie, R. L. ..... Long Prairie
Christison, J. T. ..... St. Paul
Chunn, S. S. ..... Pipestone
Clagett, O. T. ..... Rochester
Clark, F. F. ..... Duluth
Clark, H. B. ..... St. Cloud
Clark, H. H. ..... Edgerton
Clark, H. S. ..... Minneapolis
Clark, L. W. ..... Spring Valley
Clark, T. C. ..... Minneapolis
Clark, R. L., Jr. ..... Rochester
Clay, F. H. ..... St. Charles
Claydon, D. R. ..... Red Wing
Claydon, H. F. ..... Zumbrota
Claydon, L. E. ..... Red Wing
Clement, J. B. ..... Lester Prairie
Clement, T. G. ..... Duluth
Clifford, G. W. ..... Osakis
Clifton, T. A. ..... Chatfield
Cochrane, W. J. ..... Lake City
Coffey, R. J. ..... Rochester
Cohen, S. S. ..... Oak Terrace
Colby, Woodard ..... St. Paul
Cole, H. B. ..... Redwood Falls
Cole, J. G. ..... Redwood Falls
Cole, W. H. ..... St. Paul
Collie, H. G. ..... St. Paul
Collins, A. N. ..... Duluth
Collins, H. C. ..... Duluth
Collins, J. S. ..... Wabasha
Combacker, L. C. ..... Fergus Falls
Comfort, M. W. ..... Rochester
Condit, W. H. ..... Minneapolis
Conner, H. M. ..... Rochester
Connor, C. E. ..... St. Paul
Cook, C. K. ..... St. Paul
Cook, E. N. ..... Rochester
Cook, H. W. ..... Minneapolis
Cook, J. M. ..... Staples
Cooney, H. C. ..... Princeton
Cooper, M. D. ..... Winnebago
Cooperman, H. O. ..... Minneapolis
Corbett, J. F. ..... Minneapolis
Corniea, A. D. ..... Minneapolis
Corrigan, J. E. ..... Spooner
Cosman, E. O. ..... Minneapolis
Cosgriff, J. A. ..... Bird Island
Cottam, G. G. ..... Minneapolis
Counseller, V. S. ..... Rochester
Countryman, R. S. ..... St. Paul
Covell, W. W. ..... St. Peter
Coventry, W. A. ..... Duluth
Cowern, E. W. ..... North St. Paul
Cowing, P. G. ..... Evansville
Crafts, L. M. ..... Minneapolis
Cragg, R. W. ..... Rochester
Craig, W. McK. ..... Rochester
Cranmer, R. R. ..... Minneapolis
Cranston, R. W. ..... St. Louis Park
Creevy, C. D. ..... Minneapolis
Creighton, R. H. ..... Minneapolis
Cremer, P. H. ..... Hastings
Crenshaw, J. L. ..... Rochester
Cress, E. E. ..... Boyd
Cress, P. J. ..... Ellsworth
Crewe, J. E. ..... Rochester
Critchfield, L. R. ..... St. Paul
Cronwell, B. J. ..... Austin
Crow, E. R. ..... Arlington
Culligan, J. M. ..... St. Paul
Culver, L. G. ..... Thief River Falls
Cumming, J. F. ..... Morris
Curtin, J. F. ..... Minneapolis
Curtis, R. A. ..... Le Center
Cusick, P. L. ..... Rochester
Cutts, George ..... Minneapolis
Cutts, R. E. ..... Minneapolis

Dack, L. G. ..... St. Paul
Dady, E. E. ..... Minneapolis
Dahl, E. O. ..... Minneapolis
Dahl, G. A. ..... Mankato
Dahl, J. A. ..... Minneapolis
Daignault, Oscar ..... Benson
Daniel, D. H. ..... Minneapolis
Daniel, L. M. ..... Minneapolis
Danielson, K. A. ..... Litchfield
Danielson, Lennox ..... Litchfield
Darling, J. B. ..... St. Paul
Dart, L. O. ..... Minneapolis
Daugherty, E. B. ..... St. Paul
Daugherty, L. E. ..... St. Paul
Davenport, L. H. ..... Rochester
Davis, A. C. ..... Rochester
Davis, B. F. ..... Duluth
Davis, F. U. ..... Faribault
Davis, Herbert ..... St. Paul
Davis, I. G. ..... Rushford
Davis, J. C. ..... Minneapolis
Davis, L. T. ..... Wadena
Davis, T. C. ..... Wadena
Davis, William ..... St. Paul
DeBoer, Hermanus ..... Edgerton
Dedolph, Karl ..... St. Paul
Delavan, P. A. ..... St. Paul
Delmore, J. L. ..... Roseau
del Plaine, C. W. ..... Minneapolis
Demo, P. W. ..... Wells
Denman, A. V. ..... Mankato
Derauf, B. I. ..... St. Paul
Desjardins, A. U. ..... Rochester
Devereaux, T. J. ..... Wayzata
Dewey, D. H. ..... Owatonna
Dickson, T. H., Jr. ..... St. Paul
Diehl, H. S. ..... Minneapolis
Diessner, H. D. ..... Minneapolis
Dietrich, F. S., Jr. ..... Rochester
Ditmeier, Louise M. G. ..... Jasper
Dittman, G. C. ..... St. Paul
Dixon, C. F. ..... Rochester
Dolan, C. P. ..... Worthington
Doleman, N. F. ..... Tintah
Dolder, F. C. ..... Eyota
Doms, H. C. ..... Slayton
Donaldson, C. A. ..... Tuscon, Ariz.
Donohue, P. F. ..... St. Paul
Donovan, D. L. ..... Albert Lea
Doolittle, L. E. ..... Duluth
Dordal, J. ..... Sacred Heart
Dorge, R. I. ..... Minneapolis
Dornblaser, H. B. ..... Minneapolis
Dorsey, G. C. ..... Minneapolis
Dovre, C. M. ..... St. Paul
Dowswell, W. J. ..... Kerkhoven
Doxey, G. L. ..... Minneapolis
Doyle, G. C. ..... Duluth
Doyle, L. O. ..... Minneapolis
Drake, C. B. ..... St. Paul
Drake, C. R. ..... Minneapolis
Drake, F. A. ..... Lanesboro
Dredge, H. P. ..... Sandstone
Drenning, F. C. ..... Duluth
Drill, H. E. ..... Hopkins
Drips, Della G. ..... Rochester
Drought, W. W. ..... Fergus Falls
Dry, T. J. ..... Rochester
Dubbe, F. H. ..... New Ulm
DuBois, J. A. ..... Sauk Center
DuBois, J. F. ..... Sauk Center
Dudley, J. H. ..... Windom
Duff, E. R. ..... Minneapolis
Dugan, L. F. ..... Faribault
Dukelow, D. A. ..... Minneapolis
Dumas, A. G. ..... Minneapolis
Dummer, W. M. ..... Fairfax
Duncan, J. W. ..... Moorhead
Dungay, N. S. ..... Northfield
Dunlap, E. H. ..... Minneapolis
Dunn, G. R. ..... Minneapolis
Dunn, J. N. ..... St. Paul
Duryea, W. M. ..... Minneapolis
Dutton, C. E. ..... Minneapolis
Dvorak, B. A. ..... Minneapolis
Dwan, P. F. ..... Minneapolis
Dworsky, S. D. ..... Minneapolis
Dysterheft, A. F. ..... Gaylord

Earl, G. A. ..... St. Paul
Earl, Robert ..... St. Paul
Eaton, L. McK. ..... Rochester
Eberlin, E. A. ..... Glenwood
Eckman, P. F. ..... Duluth
Eckman, R. J. ..... Duluth
Edlund, G. ..... St. Paul
Edward, George ..... Canton
Edwards, G. C. ..... Grove City
Edwards, R. T. ..... Elysian
Ehrenberg, C. J. ..... Minneapolis
Ehrlich, S. P. ..... Minneapolis
Eich, Matthew ..... Minneapolis
Eisenstadt, D. H. ..... Minneapolis
Eitel, G. D. ..... Minneapolis
Ekblad, J. W. ..... Duluth
Eklund, E. J. ..... Norwood
Elias, F. J. ..... Duluth
Ellingson, A. R. ..... Detroit Lakes
Ellison, D. E. ..... Minneapolis
Ellison, F. E. ..... Monticello
Elsey, E. M. ..... Glenwood
Elsey, J. R. ..... Glenwood
Ely, O. S. ..... South St. Paul
Emanuel, K. W. ..... Duluth
Emerson, E. C. ..... St. Paul
Emmerson, W. S. ..... Mayer
Emmett, J. L. ..... Rochester
Endress, E. K. ..... St. Paul
Engberg, E. J. ..... St. Paul
Engh, Sigfred ..... Jackson
Engstrand, O. J. ..... Minneapolis
Engstrom, F. A. ..... Wanamingo
Engstrom, G. F. ..... Belgrade
Eusterman, G. B. ..... Rochester
Eppard, R. M. ..... Cloquet
Erb, F. A. ..... Minneapolis
Erdman, C. A. ..... Minneapolis
Erich, J. B. ..... Rochester
Erickson, C. W. ..... Rochester
Erickson, Eskil ..... Halstad
Erickson, R. F. ..... Minneapolis
Ericson, R. M. ..... Minneapolis
Ericson, Swan ..... Le Sueur
Ernest, G. C. ..... St. Paul
Ertel, E. O. ..... Ellendale
Eshelby, E. C. ..... St. Paul
Esser, John ..... Perham
Estrem, C. O. ..... Fergus Falls
Estrem, T. A. ..... Hibbing
Evans, E. T. ..... Minneapolis
Evans, R. D. ..... Minneapolis
Evarts, A. B. ..... Rochester
Ewald, R. P. ..... Newport
Ewens, H. B. ..... Virginia
Ewing, C. F. ..... Wheaton
Exley, E. W. F. ..... Minneapolis

Faber, J. E. ..... Rochester
Fahey, E. W. ..... St. Paul
Fahr, G. E. ..... Minneapolis
Fait, R. V. ..... Little Falls
Famiglietti, E. V. ..... Rochester
Fankboner, A. V. ..... Mountain Iron
Fansler, W. A. ..... Minneapolis
Farabaugh, C. L. ..... Owatonna
Farrish, R. C. ..... Sherburn
Fatherree, T. J., Jr. ..... Rochester
Fawcett, A. M. ..... Renville
Fawcett, C. E. ..... Stewartville
Fawcett, K. R. ..... Duluth
Feeney, J. M. ..... Minneapolis
Feldman, F. M. ..... Minneapolis
Fellows, M. F. ..... Duluth
Fenger, E. P. K. ..... Oak Terrace
Ferguson, J. C. ..... St. Paul
Fesler, H. H. ..... St. Paul
Feuling, J. C. ..... Bovey
Fiala, M. J. ..... Duluth
Figi, F. A. ..... Rochester
Fiksdal, M. J. ..... Willmar
Fine, B. A. ..... Winsted
Fink, L. W. ..... Minneapolis
Fink, W. H. ..... Minneapolis
Fischer, H. P. ..... Shakopee
Fischer, M. McC. ..... Duluth
Fisher, Laura M. ..... Rochester
Fitzgerald, D. F. ..... Minneapolis
Fitzgerald, E. T. ..... Morris
Fjeldstad, C. A. ..... Minneapolis
Flanagan, H. F. ..... St. Paul

Flanagan, L. G. ..... Austin
Flancher, L. H. ..... Lake Park
Fleischhauer, D. S. ..... Wabasha
Flesche, B. A. ..... Lake City
Flinn, T. E. ..... Redwood Falls
Flom, M. G. ..... Zumbrota
Flores, O. T. ..... Dodge Center
Fogarty, C. W. ..... St. Paul
Fogelberg, E. J. ..... St. Paul
Foker, L. W. ..... Proctor
Foley, F. E. B. ..... St. Paul
Foley, M. P. ..... Rochester
Folken, F. G. ..... Albert Lea
Folta, John ..... Ceylon
Forbes, R. S. ..... Duluth
Ford, B. C. ..... Marshall
Ford, W. H. ..... Minneapolis
Foshager, H. T. ..... Clara City
Foster, F. P. ..... Rochester
Foster, W. K. ..... Minneapolis
Fowler, L. H. ..... Minneapolis
Franchere, F. W. ..... Lake Crystal
Francis, D. W. ..... Faribault
Frary, Louise G. ..... Minneapolis
Fredericks, G. M. ..... Minneapolis
Fredrickson, Alice C. ..... Lake Lillian
Fredrickson, G. U. Y. ..... Lake Lillian
Freeman, C. D. ..... St. Paul
Freeman, G. H. ..... St. Peter
Freeman, J. P. ..... Albert Lea
Freeman, W. L. ..... St. Cloud
Freidman, L. L. ..... Minneapolis
Freligh, W. P. ..... Albert Lea
Friesleben, William ..... Sauk Rapids
Fricke, R. E. ..... Rochester
Friedell, Aaron ..... Minneapolis
Frisch, F. P. ..... Willmar
Fritsche, Albert ..... New Ulm
Fritsche, C. J. ..... New Ulm
Fritsche, T. R. ..... New Ulm
Fritzell, K. E. ..... Minneapolis
Froats, C. W. ..... Thief River Falls
Froehlich, H. W. ..... Minneapolis
Frost, E. H. ..... Willmar
Frost, H. T. ..... Wadena
Frost, R. H. ..... Wabasha
Fugina, G. R. ..... Mankato
Fuller, Alice H. ..... Rochester
Funk, V. K. ..... Oak Terrace

Gaarde, F. W. ..... Rochester
Gager, E. C. ..... St. Paul
Gaida, J. B. ..... St. Cloud
Gaines, E. C. ..... Buffalo Lake
Gallagher, B. J. ..... Waseca
Gamble, J. W. ..... Albert Lea
Gamble, P. M. ..... Albert Lea
Gammell, J. H. ..... Minneapolis
Garbrecht, Arthur ..... St. Paul
Gardiner, D. G. ..... St. Paul
Gardner, E. L. ..... Minneapolis
Gardner, V. H. ..... Fairmont
Gardner, W. P. ..... Fergus Falls
Garlock, A. V. ..... Bemidji
Garlock, D. H. ..... Bemidji
Garrow, D. M. ..... Rochester
Geer, E. K. ..... St. Paul
Gehlen, J. N. ..... St. Paul
Geist, G. A. ..... St. Paul
Gelz, J. J. ..... St. Cloud
Gerber, M. P. ..... Brainerd
Germo, Charles ..... Balaton
Ghent, C. H. ..... St. Paul
Ghent, M. M. ..... St. Paul
Ghormley, R. K. ..... Rochester
Gnostley, Mary C. ..... Puposky
Gibbons, F. C. ..... Comfrey
Gibbs, E. C. ..... St. Paul
Gibson, W. R. ..... Rochester
Giere, E. O. ..... Minneapolis
Giere, J. C. ..... Minneapolis
Giere, R. W. ..... Minneapolis
Giere, S. W. ..... Benson
Giesen, A. F. ..... Starbuck
Giessler, P. W. ..... Minneapolis
Giffin, H. Z. ..... Rochester
Gifford, B. L. ..... Long Prairie
Gilfillan, J. S. ..... St. Paul
Gilles, F. L. ..... Minneapolis
Gillespie, D. L. ..... Rochester
Gillespie, M. G. ..... Duluth
Gillespie, N. H. ..... Duluth
Gilpin, S. F., Jr. ..... Rochester
Gingold, B. A. ..... Minneapolis
Ginsberg, S. T. ..... St. Paul
Ginsberg, William ..... St. Paul
Goblirsch, A. P. ..... Sleepy Eye
Goehrs, H. W. ..... St. Cloud
Golberg, M. L. ..... Minneapolis
Golden, C. M. ..... Tyler
Goldish, D. R. ..... Duluth
Goldman, T. I. ..... Minneapolis
Goldsmith, Grace A. ..... Rochester
Goltz, E. V. ..... St. Paul
Goodman, C. E. ..... Virginia
Goss, H. C. ..... Glencoe
Gosslee, G. L. ..... Moorhead
Gowan, L. R. ..... Duluth
Graham, Robert ..... Duluth
Grant, H. W. ..... St. Paul
Gratzek, F. R. ..... Minneapolis
Gratzek, Thomas ..... St. Paul
Grave, Floyd ..... Minneapolis
Graves, W. N. ..... Duluth
Grawn, F. A. ..... Northome
Gray, F. D. ..... Marshall
Gray, H. K. ..... Rochester
Gray, R. C. ..... Minneapolis
Green, E. K. ..... Minneapolis
Greene, H. H. ..... Austin
Greene, W. P. ..... Minneapolis
Greisheimer, Esther M. ..... Minneapolis
Griffin, A. M. ..... Rochester
Griffin, P. J. ..... Fertile
Grimes, H. B. ..... Madelia
Grimes, Marian ..... Minneapolis
Grise, W. B. ..... Austin
Grogan, J. S. ..... Wadena
Gronewald, Tula W. ..... Fergus Falls
Gronvall, P. R. ..... Minneapolis
Groschupf, T. P. ..... Bemidji
Grose, F. N. ..... Clarissa
Gruenhagen, A. P. ..... St. Paul
Grunset, O. J. ..... Montrose
Gullixson, A. ..... Albert Lea
Gully, R. J. ..... St. Peter
Gunderson, H. J. ..... Rochester
Gunderson, N. A. ..... Minneapolis
Gurney, C. E. ..... Rochester
Gustason, H. T. ..... Minneapolis

Haberman, Emil ..... Osakis
Habein, H. C. ..... Rochester
Hacking, F. H. ..... Minneapolis
Haessly, S. B. ..... Faribault
Hagaman, G. K. ..... St. Paul
Hagen, O. E. ..... Butterfield
Hagen, O. J. ..... Moorhead
Haggard, G. D. ..... Minneapolis
Haight, G. G. ..... Audubon
Haines, J. H. ..... Stillwater
Haines, S. F. ..... Rochester
Hale, D. E. ..... Rochester
Hall, A. E. ..... Virginia
Hall, A. R. ..... St. Paul
Hall, B. E. ..... Rochester
Hall, H. H. ..... St. Paul
Hall, J. M. ..... Minneapolis
Hallberg, C. A. ..... Minneapolis
Hallenbeck, D. F. ..... Rochester
Halloran, W. H. ..... Jackson
Halpern, D. J. ..... Brewster
Halpin, J. E. ..... Rush City
Hamre, A. L. ..... Minneapolis
Hamilton, Angie G. S. ..Philadelphia, Pa.
Hamilton, A. S. ..... Minneapolis
Hamlin, G. B. ..... Minneapolis
Hammermeister, T. F. ..... New Ulm
Hammes, E. M. ..... St. Paul
Hammond, J. F. ..... St. Paul
Hand, W. R. ..... Elbow Lake
Haney, C. L. ..... Duluth
Hankerson, R. G. ..... Minnesota Lake
Hannah, H. B. ..... Minneapolis
Hanover, R. D. ..... Littlefork
Hansen, E. H. ..... Princeton
Hansen, E. W. ..... Minneapolis
Hansen, Olga S. ..... Minneapolis
Hanson, A. M. ..... Faribault
Hanson, E. C. ..... Park Rapids
Hanson, E. C. ..... New York Mills
Hanson, H. J. ..... Minneapolis
Hanson, H. V. ..... St. Paul
Hanson, W. A. ..... Minneapolis
Happe, L. J. ..... Marshall
Harmon, G. E. ..... St. Paul
Harriman, L. ..... Howard Lake
Harrington, C. D. ..... Minneapolis
Harrington, F. E. ..... Minneapolis
Harrington, S. W. ..... Rochester
Harris, C. N. ..... Nashwauk
Harrison, P. W. ..... Worthington
Harrison, W. C. ..... Minneapolis
Hart, V. L. ..... Minneapolis
Hart, W. E. ..... Monticello
Hartfiel, W. F. ..... St. Paul
Hartley, E. C. ..... St. Paul
Hartman, H. R. ..... Rochester
Hartzell, T. B. ..... Minneapolis
Haskell, A. D. ..... Alexandria
Hassett, R. G. ..... Mankato
Hassett, M. F. ..... St. Paul
Hastings, D. R. ..... Minneapolis
Hatch, W. E. ..... Duluth
Hathaway, S. J. ..... Proctor
Hauge, M. I. ..... Clarkfield
Hauge, M. M. ..... Clarkfield
Haugen, J. A. ..... Minneapolis
Haugseth, Enoch ..... Twin Valley
Hauser, V. P. ..... St. Paul
Havel, H. W. ..... Shakopee
Havens, F. Z. ..... Rochester
Havens, J. G. W. ..... Austin
Haverfield, Addie R. ..... Minneapolis
Hawkins, V. J. ..... St. Paul
Hawkinson, J. P. ..... Crosby
Hawkinson, L. F. ..... Brainerd
Hawkinson, R. P. ..... Robbinsdale
Hayes, J. M. ..... Minneapolis
Hayes, M. F. ..... Nashwauk
Haynes, A. L. ..... Faribault
Head, G. D. ..... Minneapolis
Head, D. P. ..... Minneapolis
Healy, R. T. ..... Pierz
Heath, A. C. ..... Stillwater
Hebeisen, M. B. ..... Chaska
Hebert, W. H. J. ..... Rochester
Heck, F. J. ..... Rochester
Heck, W. W. ..... St. Paul
Hedback, A. E. ..... Minneapolis
Hedberg, G. A. ..... Nopeming
Hedenstrom, F. G. ..... St. Paul
Hedin, R. F. ..... Red Wing
Hegge, O. H. ..... Austin
Hegge, R. S. ..... Austin
Heiam, W. C. ..... Cook
Heiberg, E. A. ..... Fergus Falls
Heilman, F. R. ..... Rochester
Heim, R. R. ..... Minneapolis
Heimark, J. J. ..... Fairmont
Heimark, O. E. ..... Duluth
Heise, W. F. C. ..... Winona
Helferty, J. K. ..... Tracy
Helk, H. H. ..... Minneapolis
Helland, G. M. ..... Spring Grove
Helland, J. W. ..... Spring Grove
Helmholz, H. F. ..... Rochester
Hempstead, B. E. ..... Rochester
Hemstead, Werner ..... St. Cloud
Hench, P. S. ..... Rochester
Henderson, A. J. ..... Kiester
Henderson, M. S. ..... Rochester
Hendrickson, J. F. ..... Minneapolis
Hendrickson, R. R. ..... Wadena
Hengstler, W. H. ..... St. Paul
Henney, W. H. ..... McIntosh
Henriksen, H. G. ..... Elko
Henrikson, E. C. ..... Minneapolis
Henry, C. E. ..... Minneapolis
Henry, M. O. ..... Minneapolis
Hensel, C. N. ..... St. Paul
Henslin, A. E. ..... Le Roy
Herbert, W. L. ..... Maynard
Herbolsheimer, A. J. ..... Minneapolis
Herman, A. L. ..... Minneapolis
Hermanson, P. E. ..... Hendricks
Heron, R. C. ..... St. Paul
Herrell, W. E. ..... Rochester
Herrmann, E. T. ..... St. Paul
Hertel, G. E. ..... Austin
Hertzog, A. J. ..... Rochester
Hesselgrave, S. S. ..... St. Paul
Heseltine, V. G. ..... Taylors Falls
Hewitt, Edith S. ..... Rochester
Hewitt, R. M. ..... Rochester
Heyerdale, O. C. ..... Rochester
Hiebert, J. P. ..... Minneapolis
Higgins, J. H. ..... Minneapolis
Higgs, W. W. ..... Park Rapids
Hilding, A. C. ..... Duluth
Hilger, A. W. ..... St. Paul
Hilger, D. D. ..... St. Paul
Hilger, L. A. ..... St. Paul
Hill, Eleanor J. ..... Minneapolis
Hill, Elmer M. ..... Big Timber, Mont.
Hill, F. E. ..... Duluth
Hines, E. A., Jr. ..... Rochester
Hiniker, L. P. ..... St. Paul
Hiniker, P. J. ..... Le Sueur
Hinshaw, H. C. ..... Rochester
Hirschboeck, F. J. ..... Duluth
Hirschfelder, A. D. ..... Minneapolis
Hirschfield, M. S. ..... Duluth
Hirshfield, F. R. ..... Minneapolis
Hoaglund, A. W. ..... Minneapolis
Hobbs, C. A. ..... Minneapolis
Hochfilzer, J. J. ..... St. Paul
Hodapp, R. J. ..... Willmar
Hodge, S. V. ..... Minneapolis
Hodgson, C. H. ..... Fergus Falls
Hodgson, H. H. ..... Crookston
Hoff, Alfred ..... St. Paul
Hoff, H. O. ..... Duluth

Hoffert, H. E. ..... Minneapolis
Hoffman, M. H. ..... St. Paul
Hoidale, A. D. ..... Tracy
Holbrook, J. S. ..... Mankato
Holcomb, J. T. ..... St. Paul
Holcomb, O. W. ..... St. Paul
Holl, P. M. ..... Minneapolis
Hollands, W. H. ..... Fisher
Holm, H. H. ..... Glencoe
Holm, P. F. ..... Wells
Holmberg, L. J. ..... Canby
Holmes, A. E. ..... Rush City
Holmstrom, C. H. ..... Warren
Holst, C. F. ..... Little Falls
Holst, J. B. ..... Little Falls
Holt, G. W. ..... Lake City
Holt, J. E. ..... St. Paul
Holt, W. B. ..... Minneapolis
Holtan, Theodore ..... Waterville
Holte, Halvor ..... Crookston
Horton, B. T. ..... Rochester
Hottinger, R. C. ..... Janesville
Houkom, Bjarne ..... Minneapolis
House, Z. E. ..... Cass Lake
Hovde, Rolf ..... Winthrop
Howard, M. A. ..... St. Paul
Howard, M. I. ..... Mankato
Howard, W. H. ..... Minneapolis
Howard, W. S. ..... St. Paul
Howell, L. P. ..... Rochester
Hoyer, L. J. ..... Howard
Hubbard, O. E. ..... Brainerd
Hubin, E. G. ..... Deerwood
Hubly, J. W. ..... Rochester
Huenekens, E. J. ..... Minneapolis
Hughes, L. D. ..... Minneapolis
Hullsiek, R. B. ..... St. Paul
Hultkrans, J. C. ..... St. Paul
Hultkrans, R. E. ..... Minneapolis
Humphrey, E. W. ..... Moorhead
Humphrey, W. R. ..... Stillwater
Hunt, A. B. ..... Rochester
Hunt, R. C. ..... Fairmont
Hunte, A. F. ..... Bylas, Ariz.
Hurd, Annah ..... Minneapolis
Hutchinson, C. J. ..... Minneapolis
Hutchinson, Henry ..... Willmar
Huxley, F. R. ..... Faribault
Hymes, Charles ..... Minneapolis
Hynes, J. E. ..... Minneapolis

Ide, A. W. ..... St. Paul
Ikeda, Kano ..... St. Paul
Ingebrigtson, E. K. ..... Moorhead
Ingerson, C. A. ..... St. Paul
Irvine, H. G. ..... Minneapolis

Jackman, R. J. ..... Rochester
Jackson, C. M. ..... Minneapolis
Jacobs, A. C. ..... Elmore
Jacobs, D. C. ..... Willmar
Jacobs, G. C. ..... Fergus Falls
Jacobs, J. C. ..... Willmar
Jacobson, Clarence ..... Chisholm
Jacobson, D. J. ..... Blackduck
Jacquot, G. L. ..... Marshall
Jamieson, Earl ..... Walnut Grove
Jennings, F. I. ..... Oak Terrace
Jennings, Mary H. ..... Minneapolis
Jensen, A. H. ..... Hutchinson
Jensen, A. M. ..... Brownton
Jensen, Harry ..... Minneapolis
Jensen, H. H. ..... Atwater
Jensen, M. J. ..... Minneapolis
Jensen, T. J. ..... Duluth
Jerome, Bourne ..... Emmons
Jesion, J. W. ..... St. Paul
Johanson, W. G. ..... St. Paul
Johnson, A. B. ..... Minneapolis
Johnson, A. E. ..... Red Wing
Johnson, A. E. ..... Minneapolis
Johnson, A. M. ..... St. Paul
Johnson, C. E. ..... Pine River
Johnson, C. M. ..... Dawson
Johnson, D. W. ..... Fairmont
Johnson, D. L. ..... Cambridge
Johnson, E. W. ..... Bemidji
Johnson, Hans ..... Kerkhoven
Johnson, H. A. ..... Minneapolis
Johnson, H. P. ..... Fairmont
Johnson, H. P. ..... Harmony
Johnson, J. A. ..... St. Paul
Johnson, J. A. ..... Minneapolis
Johnson, Julius ..... Minneapolis
Johnson, N. A. ..... Minneapolis
Johnson, Norman ..... Minneapolis
Johnson, O. H. ..... Redwood Falls
Johnson, O. V. ..... Fergus Falls
Johnson, R. A. ..... Minneapolis
Johnson, R. B. ..... Lanesboro
Johnson, R. E. ..... Worthington

Johnson, R. G. ..... St. Paul
Johnson, S. M. ..... Minneapolis
Johnson, T. H. ..... San Francisco, Calif.
Johnson, V. E. ..... Walker
*Johnson, V. P. ..... Delano
Johnson, Walfred ..... Sauk Center
Johnson, W. E. ..... Morgan
Johnson, Y. T. ..... Minneapolis
Johnston, L. F. ..... Minneapolis
Jolin, F. M. ..... Grand Rapids
Jolin, R. V. ..... Grand Rapids
Jones, A. W. ..... Red Wing
Jones, D. C. ..... St. Paul
Jones, E. M. ..... St. Paul
Jones, H. M. ..... Rochester
Jones, H. W. ..... Minneapolis
Jones, G. M. ..... Minneapolis
Jones, R. N. ..... St. Cloud
Jones, W. R. ..... Minneapolis
Jordan, L. S. ..... Granite Falls
Josewich, Alexander ..... Minneapolis
Josewski, R. J. ..... Stillwater
Joyce, G. L. ..... Stewartville
Joyce, G. T. ..... Rochester
Juergens, H. M. ..... Belle Plaine
Juers, E. H. ..... Red Wing
Juliar, R. O. ..... St. Clair
Just, H. J. ..... Lafayette

Kaasa, L. J. ..... Albert Lea
Kadesky, David ..... St. Paul
Kalin, O. T. ..... Minneapolis
Kalinoff, D. ..... Stillwater
Kamman, G. R. ..... St. Paul
Kamp, B. A. ..... Albert Lea
Kannary, E. L. ..... St. Paul
Kanne, C. W. ..... Faribault
Kaplan, D. H. ..... St. Paul
Karleen, P. E. ..... Spring Valley
Karn, B. R. ..... Ortonville
Kasper, E. M. ..... St. Paul
Kath, R. H. ..... Wood Lake
Katzberg, L. W. ..... Fergus Falls
Kaufman, W. C. ..... Appleton
Kaump, D. H. ..... Rochester
Keith, N. M. ..... Rochester
Kelby, G. M. ..... Minneapolis
Kelly, B. W. ..... Aitkin
Kelly, J. V. ..... St. Paul
Kelly, P. H. ..... St. Paul
Kelsey, C. G. ..... Hinckley
Kemble, J. W. ..... Rochester
Kemp, A. F. ..... Mankato
Kendahl, A. M. ..... Jasper
Kenefick, E. V. ..... St. Paul
Kennedy, C. C. ..... Minneapolis
Kennedy, Jane F. ..... Minneapolis
Kennedy, R. L. J. ..... Rochester
Kennedy, R. R. ..... Minneapolis
Kennedy, W. A. ..... St. Paul
Kepler, E. J. ..... Rochester
Kerlan, Irvin ..... McGregor
Kerlan, S. Z. ..... Aitkin
Kernohan, J. W. ..... Rochester
Kerschbaumer, Louisa ..... St. Peter
Kertesz, G. ..... Minneapolis
Kesting, Herman ..... St. Paul
Kettlewell, R. B. ..... Sauk Center
Keyes, C. R. ..... Duluth
Keyes, J. D. ..... Winona
Kibbe, O. A. ..... Minneapolis
Kierland, P. E. ..... Alexandria
Kilbride, E. A. ..... Worthington
Kilbride, J. S. ..... Canby
King, E. A. ..... Minneapolis
King, G. L. ..... St. Paul
King, H. T. ..... Minneapolis
King, Z. P. ..... St. Paul
Kinsella, T. J. ..... Oak Terrace
Kirk, G. P. ..... East Grand Forks
Kirklin, B. R. ..... Rochester
Kirklin, O. L. ..... Rochester
Kistler, A. J. ..... Minneapolis
Kistler, C. M. ..... Minneapolis
Klein, Harry ..... Duluth
Klein, H. N. ..... St. Paul
Klima, W. W. ..... Stewart
Knapp, F. N. ..... Duluth
Knapp, M. E. ..... Minneapolis
Knauff, M. K. ..... St. Paul
Knepper, P. A. ..... Rochester
Knight, R. R. ..... Minneapolis
Knight, R. T. ..... Minneapolis
Knutson, G. A. ..... Greenbush
Koelsche, G. A. ..... Rochester
Koepcke, G. M. ..... Minneapolis
Kohlbry, C. O. ..... Duluth
Kohler, D. W. ..... St. Joseph
Kolars, J. J. ..... Le Center
Koller, H. M. ..... Minneapolis
Koller, L. R. ..... Minneapolis
Kolset, C. D. ..... Sanborn

Kooiker, H. J. ..... Milaca
Koop, S. H. ..... Richmond
Kotchevar, F. R. ..... Eveleth
Kraft, Peter ..... Duluth
Krantz, C. I. ..... Duluth
Kreuzer, T. C. ..... Owatonna
Kroeze, R. G. ..... Rochester
Krusen, F. H. ..... Rochester
Kucera, F. J. ..... Hopkins
Kucera, S. T. ..... Lonsdale
Kucera, W. J. ..... Minneapolis
Kugler, A. A. ..... St. Paul
Kuhlmann, August ..... Melrose
Kusske, A. L. ..... New Ulm
Kuth, J. R. ..... Duluth
Kvitrud, Gilbert ..... St. Paul

Laird, A. T. ..... Nopeming
Lajoie, J. M. ..... Minneapolis
Lamb, H. L. ..... Little Falls
Laney, R. L. ..... Fertile
Langenderfer, F. V. ..... St. Paul
Langhoff, A. H. ..... Glencoe
Lannin, J. C. ..... Mabel
Lapierre, A. P. ..... Minneapolis
Lapierre, C. A. ..... Minneapolis
Lapierre, J. T. ..... Minneapolis
Larsen, C. L. ..... St. Paul
Larsen, F. W. ..... Minneapolis
Larsen, O. O. ..... Detroit Lakes
Larson, Arnold ..... Detroit Lakes
Larson, C. M. ..... Minneapolis
Larson, J. T. ..... Lake Wilson
Larson, L. J. ..... Bagley
Larson, L. M. ..... Minneapolis
Larson, L. M. ..... Oak Terrace
Larson, P. N. ..... Minneapolis
Laughlin, J. T. ..... Grey Eagle
Laurent, A. A. ..... Minneapolis
LaVake, R. T. ..... Minneapolis
Lax, M. H. ..... St. Paul
Laymon, C. W. ..... Minneapolis
Lazar, H. L. ..... Minneapolis
Leahy, Bartholomew ..... St. Paul
Leavenworth, R. O. ..... St. Paul
Leavitt, H. H. ..... Minneapolis
Lebowske, J. A. ..... Minneapolis
Leck, P. C. ..... Austin
Leddy, E. T. ..... Rochester
Lee, H. M. ..... Minneapolis
Lee, J. L. ..... Watertown
Lee, S. R. ..... St. Paul
Lee, W. A. ..... Fergus Falls
Lee, W. N. ..... Madison
Leibold, H. H. ..... Parkers Prairie
Leitch, Archibald ..... St. Paul
Leitch, N. M. ..... Warroad
Leland, H. R. ..... Minneapolis
Leland, J. T. ..... Herman
Lemon, R. G. ..... Rochester
Lemon, W. S. ..... Rochester
Lenander, M. E. ..... St. Peter
Lende, Norman ..... Faribault
Lenont, C. B. ..... Virginia
Lenton, H. P. ..... Rochester
Lenz, J. R. ..... Morton
Lenz, O. A. ..... Minneapolis
Leonard, G. J. ..... Hastings
Leonard, L. J. ..... Minneapolis
Leonard, Sam ..... Minneapolis
Leopard, B. A. ..... Albert Lea
Lepak, F. J. ..... Duluth
Lepak, J. A. ..... St. Paul
Lerche, William ..... Cable, Wis.
Leser, R. U. ..... Rochester
Leven, N. L. ..... St. Paul
Levi, Sam ..... Red Wing
Levin, Bert ..... St. Paul
Levine, N. M. ..... Minneapolis
Lewis, A. J. ..... Henning
Lewis, C. B. ..... St. Cloud
Lewis, E. B. ..... Rochester
Lexa, F. J. ..... Lonsdale
Libert, J. N. ..... St. Cloud
Lichtenstein, H. ..... Winona
Lick, C. L. ..... St. Paul
Liedloff, A. G. ..... Mankato
Liffrig, W. W. ..... Goodhue
Lightbourn, E. T. ..... Jordan
Lillehei, E. J. ..... Robbinsdale
Lillie, H. I. ..... Rochester
Lima, Ludvig ..... Montevideo
Lind, C. J. ..... Minneapolis
Lindahl, M. J. ..... Jasper
Lindberg, A. L. ..... Wheaton
Linde, Herman ..... Cyrus
Lindquist, R. H. ..... Minneapolis
Lindsay, W. V. ..... Winona
Linner, Gunnar ..... Stillwater
Linner, H. P. ..... Minneapolis
Linton, W. B. ..... Minneapolis
Lippman, H. S. ..... St. Paul
Lippmann, E. W. ..... Hutchinson

*Deceased.

Lipschultz, Oscar ..... Minneapolis
Litman, A. B. ..... Minneapolis
Litman, S. N. ..... Duluth
Little, W. J. ..... St. Paul
Litzenberg, J. C. ..... Minneapolis
Livingstone, J. W. ..... Hudson, Wis.
Lloyd, H. J. ..... Mankato
Lochead, D. C. ..... Rochester
Locken, O. E. ..... Crookston
Loenholdt, E. H. ..... Hector
Logan, A. H. ..... Rochester
Logan, F. W. ..... Blue Earth
Logefeil, R. C. ..... Minneapolis
Lommen, P. A. ..... Austin
Long, Jesse ..... Minneapolis
Loofbourrow, E. H. ..... Keewatin
Loomis, E. A. ..... Minneapolis
Love, F. A. ..... Carlos
Love, J. G. ..... Rochester
Lowe, E. R. ..... So. St. Paul
Lowe, Thomas ..... Pipestone
Lowe, T. A. ..... So. St. Paul
Luden, Georgine ..... Victoria, B. C., Can.
Luedtke, G. H. ..... Fairmont
Lufkin, C. D. ..... Northfield
Lund, C. J. T. ..... Underwood
Lundblad, R. A. ..... Minneapolis
Lundgren, A. C. ..... Minneapolis
Lundholm, A. M. ..... St. Paul
Lundquist, C. W. ..... Coleraine
Lundquist, E. F. ..... Minneapolis
Lundy, J. S. ..... Rochester
Lynch, F. W. ..... St. Paul
Lynch, M. J. ..... Minneapolis
Lynde, O. G. ..... Thief River Falls
Lynn, J. F. ..... Waseca
Lyon, E. P. ..... Minneapolis
Lysne, Henry ..... Minneapolis

Macbeth, J. L. ..... St. Clair
MacDonald, A. E. ..... Minneapolis
MacDonald, D. A. ..... Minneapolis
MacDonald, I. C. ..... Minneapolis
Macey, H. B. ..... Rochester
Mach, F. B. ..... Minneapolis
Mack, J. J. ..... Magnolia, Ark.
Macklin, W. E., Jr. ..... Litchfield
MacLean, A. R. ..... Rochester
Macnie, J. S. ..... Minneapolis
MacRae, G. C. ..... Duluth
Madden, J. F. ..... St. Paul
Madland, R. S. ..... Fairfax
Maertz, W. F. ..... New Prague
Magath, T. B. ..... Rochester
Magiera, Estelle A. ..... Rochester
Magney, F. H. ..... Duluth
Mahowald, A. ..... Albany
Maitland, D. P. ..... Jackson
Maitland, E. T. ..... Jackson
Makaroff, W. N. ..... Minneapolis
Maland, C. O. ..... Minneapolis
Malerich, J. A. ..... Caledonia
Malmstrom, J. A. ..... Virginia
Manley, J. R. ..... Duluth
Manley, L. V. ..... Albert Lea
Manson, F. M. ..... Worthington
Mann, F. C. ..... Rochester
Marcley, D. M. ..... Rochester
Marcley, W. J. ..... Minneapolis
Marcum, E. H. ..... Bemidji
Mariette, E. S. ..... Oak Terrace
Mark, D. B. ..... Minneapolis
Mark, Hilbert ..... Ah-Gwah-Ching
Markoe, J. C. ..... St. Paul
Martin, E. T. ..... Duluth
Martin, T. P. ..... Arlington
Martin, W. C. ..... Duluth
Martineau, J. L. ..... St. Paul
Martinson, C. J. ..... Wayzata
Mason, J. A. ..... International Falls
Masson, D. M. ..... Rochester
Masson, J. C. ..... Rochester
Matchan, G. R. ..... Minneapolis
Matthews, Justus ..... Minneapolis
Mattill, P. M. ..... Oak Terrace
Mattison, P. A. ..... Winona
Mattson, C. H. ..... St. Paul
Mattson, Hamlin ..... Minneapolis
Maxeiner, S. R. ..... Minneapolis
May, W. H. ..... Minneapolis
Mayland, M. L. ..... Faribault
Mayne, R. M. ..... Duluth
Mayo, C. H. ..... Rochester
Mayo, C. W. ..... Rochester
Mayo, J. G. ..... Rochester
Mayo, W. J. ..... Rochester
Maytum, C. K. ..... Rochester
McBroom, D. E. ..... Cambridge
McCann, D. F. ..... Bemidji
McCarthy, Donald ..... Minneapolis
McCarthy, J. J. ..... St. Paul
McCarthy, W. J. ..... Madelia
McCarthy, W. R. ..... St. Paul

McCartney, J. S. ..... Minneapolis
McCarty, P. D. ..... Ely
McCarty, W. C. ..... Rochester
McClanahan, J. H. ..... White Bear
McClanahan, T. S. ..... White Bear
McComb, C. F. ..... Duluth
McCoy, Mary K. ..... Duluth
McCrea, J. M. ..... Fulda
McDaniel, Orianna ..... Minneapolis
McDaniel, S. P. ..... Mountain Iron
McDonald, A. L. ..... Duluth
McDonald, J. R. ..... Rochester
McDowell, J. P. ..... St. Cloud
McEnaney, C. T. ..... Owatonna
McFarland, A. H. ..... Minneapolis
McGandy, R. F. ..... Minneapolis
McGeary, G. E. ..... Minneapolis
McGroarity, J. J. ..... Easton
McGowan, J. M. ..... Rochester
McGregor, Catherine ..... Minneapolis
McGuigan, H. T. ..... Red Wing
McHaffie, O. L. ..... Duluth
McInerny, Maurice ..... Minneapolis
McIntire, H. M. ..... Waseca
McIntyre, George ..... Minneapolis
McIntyre, J. A. ..... Owatonna
McIver, B. A. ..... Lowry
McKaig, C. B. ..... Pine Island
McKean, R. S. ..... Rochester
McKechnie, R. E. ..... Rochester
McKenna, J. K. ..... Austin
McKenna, M. J. ..... Graceville
McKeon, J. O. ..... Montgomery
McKeown, E. G. ..... Pipestone
McKinlay, C. A. ..... Minneapolis
McKinley, J. C. ..... Minneapolis
McKinney, F. S. ..... Minneapolis
McLaren, Jennette M. ..... St. Paul
McLaughlin, E. M. ..... Winona
McLeod, J. L. ..... Grand Rapids
McMahon, M. J. ..... Green Isle
McNevin, C. I. ..... St. Paul
McNutt, J. R. ..... Duluth
McPheeters, H. O. ..... Minneapolis
McQuarrie, Irvine ..... Minneapolis
McTamaney, R. A. ..... Rochester
Mead, C. H. ..... Duluth
Meade, J. R. ..... St. Paul
Mears, B. J. ..... St. Paul
Meckstroth, C. W. ..... Brandon
Mee, P. H. ..... Osseo
Meinert, A. E. ..... Winona
Meland, E. L. ..... Minneapolis
Melby, Benedik ..... Blooming Prairie
Mellby, O. F. ..... Thief River Falls
Melzer, G. R. ..... Lyle
Mercil, W. F. ..... Crookston
Merkert, C. E. ..... Minneapolis
Merkert, G. L. ..... Minneapolis
Merrill, Elizabeth ..... Minneapolis
Merriman, L. L. ..... Duluth
Merrit, W. A. ..... Albert Lea
Mesker, G. H. ..... Olivia
Meyer, A. A. ..... Melrose
Meyer, E. L. ..... Minneapolis
Meyer, F. C. ..... Kenyon
Meyer, P. F. ..... Faribault
Meyerding, E. A. ..... St. Paul
Meyerding, H. W. ..... Rochester
Michael, J. C. ..... Minneapolis
Michelson, H. E. ..... **Minneapolis**
Miller, H. A. ..... Fairmont
Miller, H. E. ..... Minneapolis
Miller, J. C. ..... Minneapolis
Miller, V. I. ..... Mankato
Miller, W. A. ..... New York Mills
Mills, J. H. ..... Rochester
Mills, J. L. ..... Winnebago
Milton, J. S. ..... Minneapolis
Mingo, F. E. ..... Hugo
Mitchell, R. S. ..... Grand Meadow
Moberg, C. W. ..... Lake Park
Moe, J. H. ..... Minneapolis
Moe, R. J. ..... Duluth
Moe, Thomas ..... Moose Lake
Moersch, F. P. ..... Rochester
Moersch, H. J. ..... Rochester
Moga, J. A. ..... St. Paul
Mogilner, S. N. ..... **St. Paul**
Moir, W. W. ..... Minneapolis
Molander, H. A. ..... St. Paul
Monroe, P. B. ..... Two Harbors
Monson, L. J. ..... Hendricks
Montgomery, Hamilton ..... Rochester
Moorhead, Martha B. ..... Minneapolis
Moquin, Marie A. ..... St. Paul
Moran, T. R. ..... St. Paul
More, C. W. ..... Eveleth
Morehead, D. E. ..... Owatonna
Moren, Edward ..... Minneapolis
Moriarty, Berenice ..... St. Paul
Moriarty, Cecile R. ..... Minneapolis
Mork, B. O., Jr. ..... Worthington

Mork, B. O., Sr. ..... Worthington
Morley, G. A. ..... Crookston
Morlock, C. G. ..... Rochester
Morrison, A. W. ..... Minneapolis
Morrissey, F. B. ..... St. Paul
Morrow, J. J. ..... Austin
Morse, M. P. ..... Le Roy
Morse, R. W. ..... Minneapolis
Morsman, L. W. ..... Hibbing
Morss, C. R. ..... Zumbrota
Mortenson, N. G. ..... St. Paul
Morton, H. McI. ..... Vincentown, N. J.
Mosby, M. E. ..... Long Prairie
Moses, Joseph, Jr. ..... Northfield
Moses, R. R. ..... Kenyon
Moss, M. N. ..... St. Paul
Moyer, R. E. ..... Ft. Snelling
Moynihan, A. F. ..... Sauk Center
Moynihan, T. J. ..... St. Paul
Mueller, Selma C. ..... Duluth
Muller, R. T. ..... St. Paul
Mulrooney, R. E. ..... Rochester
Murdoch, J. M. ..... Faribault
Murphy, I. J. ..... Minneapolis
Mussey, R. D. ..... Rochester
Myers, J. A. ..... Minneapolis
Myers, Thomas ..... St. Paul

Naegeli, A. E. ..... St. Paul
Naegeli, Frank ..... Fergus Falls
Nagel, H. D. ..... Waconia
Naslund, A. W. ..... St. Paul
Nass, H. A. ..... Mabel
Nathanson, M. H. ..... Minneapolis
Nauth, W. W. ..... Winona
Neal, J. M. ..... Minneapolis
Neary, R. P. ..... Minneapolis
Neher, F. H. ..... St. Paul
Neilson, H. F. ..... Minneapolis
Nelson, E. H. ..... Chisholm
Nelson, E. J. ..... Owatonna
Nelson, L. A. ..... St. Paul
Nelson, Harvey ..... Minneapolis
Nelson, H. S. ..... Minneapolis
Nelson, M. C. ..... Lowry
Nelson, M. S. ..... Granite Falls
Nelson, N. P. ..... Brainerd
Nelson, O. E. ..... Minneapolis
Nelson, R. L. ..... Duluth
Nelson, W. I. ..... Minneapolis
Ness, Claire M. ..... Cambridge
Nesselrod, J. P. ..... Rochester
Nethercott, E. G. ..... Pine City
Nettrour, W. S. ..... Rochester
Neumann, C. A. ..... Winona
New, G. B. ..... Rochester
Newhart, Horace ..... Minneapolis
Nichols, A. E. ..... St. Paul
Nicholson, M. A. ..... Duluth
Nilson, H. J. ..... North Mankato
Ninneman, N. N. ..... Silver Lake
Nippert, H. T. ..... St. Paul
Noble, J. F. ..... St. Paul
Noble, J. L. ..... Willmar
Nordin, G. T. ..... Minneapolis
Nordland, Martin ..... Minneapolis
Nordman, W. F. ..... Mora
Norman, J. F. ..... Crookston
Norrgard, H. T. ..... Milaca
Novak, E. E. ..... New Prague
Noth, H. W. ..... Minneapolis
Nuessle, W. G. ..... Springfield
Nuetzman, A. W. ..... Faribault
Nutting, R. E. ..... Duluth
Nye, Katherine A. ..... St. Paul
Nye, Lillian L. ..... St. Paul
Nygren, W. T. ..... Braham
Nystrom, Ruth ..... Minneapolis

Oberg, C. M. ..... Minneapolis
O'Brien, W. A. ..... Minneapolis
Ochsner, C. G. ..... Wabasha
O'Connor, D. C. ..... Eden Valley
O'Connor, L. J. ..... St. Paul
Odel, H. M. ..... Rochester
O'Donnell, J. E. ..... Minneapolis
Oeljen, S. C. G. ..... Waseca
Oerting, Harry ..... St. Paul
Ogden, Warner ..... St. Paul
Ohage, Justus, Jr. ..... St. Paul
Ohnstad, J. L. ..... McIntosh
Olds, G. H. ..... Waseca
O'Leary, P. A. ..... Rochester
Oliver, C. I. ..... Graceville
Oliver, I. L. ..... Graceville
Olson, A. E. ..... Duluth
Olson, C. A. ..... St. Paul
Olson, C. J. ..... Belle Plaine
Olson, E. A. ..... Pine Island
Olson, F. A. ..... Minneapolis
Olson, J. W. ..... Cokato
Olson, K. L. ..... Gibbon

Olson, O. A. ..... Minneapolis
Olson, P. F. ..... Rochester
Olson, R. G. ..... Minneapolis
Olson, W. P. ..... Gaylord
O'Neal, B. L. ..... Rochester
Onsgard, L. K., Jr. ..... Houston
Onsgard, L. K., Sr. ..... Houston
Oppegaard, C. L. ..... Crookston
Oppegaard, M. O. ..... Crookston
Oppen, E. G. ..... Minneapolis
O'Reilley, B. E. ..... St. Paul
Ormond, D. T. ..... Waconia
Osborn, Lida ..... Mankato
Osburn, B. F. ..... International Falls
Ostergren, E. W. ..... St. Paul
Otto, H. C. ..... Frazee
Ouelette, A. J. ..... St. Paul
Owre, Oscar ..... Minneapolis

Pace, J. McI. ..... Haskell, Texas
Page, C. V. ..... St. Paul
Page, R. L. ..... St. Charles
Palmer, C. F. ..... Albert Lea
Palmer, W. L. ..... Albert Lea
Pankratz, P. J. ..... Mountain Lake
Paradis, W. G. ..... Crookston
Parker, O. W. ..... Ely
Parker, R. L. ..... Rochester
Parkhill, Edith M. ..... Rochester
Parks, A. H. ..... Minneapolis
Parson, Lillian B. ..... Elbow Lake
Parson, L. R. ..... Elbow Lake
Parsons, J. G. ..... Crookston
Passer, A. A. ..... Olivia
Patterson, W. E. ..... Minneapolis
Patterson, W. E. ..... Westbrook
Patterson, W. L. ..... Fergus Falls
Paulsen, E. L. ..... Minneapolis
Paulson, T. S. ..... Fergus Falls
Pearce, N. O. ..... Minneapolis
Pearson, B. F. ..... Shakopee
Pearson, F. R. ..... St. Paul
Peck, L. D. ..... Hastings
Peck, L. R. ..... Hastings
Pedersen, A. H. ..... St. Paul
Pederson, R. M. ..... Minneapolis
Pemberton, J. deJ. ..... Rochester
Penhall, F. W. ..... Morton
Penn, G. E. ..... Mankato
Pennie, D. F. ..... Duluth
Pennington, Reuben ..... Minneapolis
Peppard, T. A. ..... Minneapolis
Perry, C. G. ..... St. Paul
Perry, R. St. J. ..... Minneapolis
Persons, C. E. ..... Marshall
Pertl, A. L. ..... Windom
Petersen, J. R. ..... Minneapolis
Petersen, M. C. ..... Willmar
Petersen, P. C. ..... Ogilvie
Petersen, Thorvald ..... Minneapolis
Peterson, A. A. ..... Mora
Peterson, D. B. ..... St. Paul
Peterson, D. L. ..... Rochester
Peterson, E. N. ..... Eveleth
Peterson, Henry ..... Minneapolis
Peterson, H. W. ..... Minneapolis
Peterson, J. H. ..... Duluth
Peterson, J. L. E. ..... St. Paul
Peterson, N. P. ..... Minneapolis
Peterson, O. H. ..... Minneapolis
Peterson, O. I. ..... Cokato
Peterson, P. E. ..... Minneapolis
Peterson, R. A. ..... Vesta
Peterson, V. N. ..... St. Paul
Peterson, W. C. ..... Minneapolis
Petit, L. J. ..... Minneapolis
Petraborg, H. T. ..... Aitkin
Petter, C. K. ..... Oak Terrace
Pettit, C. W. ..... Minneapolis
Peyton, W. T. ..... Minneapolis
Pfunder, M. C. ..... Minneapolis
Phelps, K. A. ..... Minneapolis
Phillips, A. E. ..... Delano
Phillips, W. H. ..... Jordan
Pierce, C. H. ..... Wadena
Pilcher, Frederick, Jr. ..... Rochester
Piper, M. C. ..... Rochester
Piper, W. A. ..... Mountain Lake
Platou, E. S. ..... Minneapolis
Plondke, F. J. ..... St. Paul
Plonske, C. J. ..... Faribault
Plummer, H. S. ..... Rochester
Plummer, W. A. ..... Rochester
Pogue, R. E. ..... Watertown
Poirier, J. A. ..... Forest Lake
Pollard, D. W. ..... Minneapolis
Pollock, D. K. ..... Minneapolis
Pollock, L. W. ..... Rochester
Polzak, J. A. ..... Minneapolis
Pool, T. L. ..... Rochester
Popp, W. C. ..... Rochester
Poppe, F. H. ..... Minneapolis
Portmann, W. C. ..... Jackson
Potek, David ..... Minneapolis
Powell, W. N. ..... Rochester
Power, J. E. ..... Duluth
Powers, F. H. ..... Rochester
Powers, F. W. ..... Barrett
Prangen, A. D. ..... Rochester
Pratt, F. J. ..... Minneapolis
Pratt, J. A. ..... Minneapolis
Preine, I. A. ..... Minneapolis
Prendergast, H. J. ..... St. Paul
Prickman, L. E. ..... Rochester
Priest, R. E. ..... Worthington
Priestley, J. T. ..... Rochester
Prim, J. A. ..... Minneapolis
Prins, L. R., Jr. ..... St. Paul
Proshek, C. E. ..... Minneapolis
Purves, G. H. ..... Russell

Quanstrom, V. E. ..... Brainerd
Quinby, T. F. ..... Minneapolis
Quist, H. W. ..... Minneapolis

Raadquist, C. S. ..... Hibbing
Raaf, J. E. ..... Rochester
Radabaugh, R. C. ..... Hastings
Raiter, F. W. S. ..... Cloquet
Raiter, R. F. ..... Cloquet
Ramsey, W. R. ..... St. Paul
Randall, A. M. ..... Ashby
Randall, L. M. ..... Rochester
Ransom, M. L. ..... Hancock
Rasmussen, R. C. ..... St. Paul
Rathbun, C. A. ..... St. Cloud
Raymond, J. H. ..... Triumph
Reed, C. A. ..... Minneapolis
Reeve, E. T. ..... Elbow Lake
Reff, A. R. ..... Crookston
Regnier, E. A. ..... Minneapolis
Reichelderfer, C. F. ..... Staples
Reimann, H. A. ..... Minneapolis
Reineke, G. F. ..... New Ulm
Reiter, H. W. ..... Shakopee
Rempel, D. D. ..... Brownton
Reynolds, J. S. ..... Minneapolis
Rhorer, R. J. ..... Rochester
Rice, C. O. ..... Minneapolis
Richards, E. T. F. ..... St. Paul
Richards, W. B. ..... St. Cloud
Richardson, F. S. ..... Minneapolis
Richardson, H. E. ..... St. Paul
Richdorf, L. F. ..... Minneapolis
Richmond, C. D. ..... Jeffers
Ridgway, Alexander ..... South Haven
Ridgway, A. M. ..... Annandale
Rieke, W. W. ..... Wayzata
Rigler, L. G. ..... St. Paul
Rimer, E. W. ..... Breckenridge
Ringle, O. F. ..... Walker
Rishmiller, J. H. ..... Minneapolis
Risser, E. D. ..... Winona
Ritchie, H. P. ..... St. Paul
Ritt, A. E. ..... St. Paul
Rivers, A. B. ..... Rochester
Rizer, R. I. ..... Minneapolis
Roan, C. M. ..... Minneapolis
Robb, E. F. ..... Minneapolis
Robbins, C. P. ..... Winona
Roberts, L. M. ..... Little Falls
Roberts, O. W. ..... Owatonna
Roberts, Stanley W. ..... Minneapolis
Roberts, T. S. ..... Minneapolis
Roberts, W. B. ..... Minneapolis
Robertson, H. E. ..... Rochester
Robertson, J. B. ..... Minneapolis
Robertson, P. A. ..... Austin
Robilliard, C. M. ..... Faribault
Robinson, J. M. ..... Duluth
Robinson, Van C. ..... Rochester
Robitshek, E. C. ..... Minneapolis
Rochford, W. E. ..... Minneapolis
Rodda, F. C. ..... Minneapolis
Roehlke, A. B. ..... Elk River
Roger, J. T. ..... St. Paul
Rogers, S. F. ..... St. Paul
Roholt, C. L. ..... Waverly
Rohrer, C. A. ..... Waterville
Rood, D. C. ..... Hibbing
Rose, J. T. ..... Lakefield
Rosen, Samuel ..... Minneapolis
Rosenfield, A. B. ..... Pequot
Rosenholtz, Burton ..... St. Paul
Rosenow, E. C. ..... Rochester
Rosenthal, F. H. ..... Grand Meadow
Rosenthal, Robert ..... St. Paul
Rosenwald, R. M. ..... Minneapolis
Ross, W. P. ..... Worthington
Roth, F. D. ..... Lewiston
Rothenburg, J. C. ..... Springfield
Rothrock, J. L. ..... St. Paul
Rothschild, H. J. ..... St. Paul
Rousseau, Victor ..... Maple Lake
Roust, H. A. ..... Montevideo
Rowe, O. W. ..... Duluth
Rowe, W. H. ..... Fairmont
Roy, J. A. ..... Red Lake Falls
Roy, Philemon ..... St. Paul
Rozendaal, H. M. ..... Rochester
Rucker, C. W. ..... Minneapolis
Rucker, W. H. ..... Minneapolis
Rud, N. E. ..... Minneapolis
Rudell, G. L. ..... Minneapolis
Rudie, C. N. ..... Kenyon
Rudie, P. S. ..... Duluth
Ruggles, G. McC. ..... Forest Lake
Ruhberg, G. N. ..... St. Paul
Rumpf, C. W. ..... Faribault
Rumpf, W. H. ..... Faribault
Rupp, Alice ..... East Cleveland, Ohio
Russ, H. H. ..... Blue Earth
Russeth, A. N. ..... Minneapolis
Rusten, E. M. ..... Minneapolis
Rutherford, W. C. ..... St. Paul
Rutledge, L. H. ..... Detroit Lakes
Ryan, J. J. ..... St. Paul
Ryan, J. M. ..... St. Paul
Ryan, M. E. ..... St. Paul
Ryan, W. J. ..... Duluth
Rydburg, W. C. ..... Brooten
Rynearson, E. H. ..... Rochester

Sach-Rowitz, Alvin ..... Moose Lake
Sadler, W. P. ..... Minneapolis
Saffert, C. A. ..... New Ulm
Sahr, W. G. ..... Hutchinson
St. Cyr, K. J. ..... Osseo
Saliterman, B. I. ..... Minneapolis
Salt, C. G. ..... Minneapolis
Salter, R. A. ..... Virginia
Samuelson, L. G. ..... Mankato
Samuelson, Samuel ..... Minneapolis
Sanderson, E. T. ..... Minneota
Sanford, A. H. ..... Rochester
Sarff, O. E. ..... Buhl
Sarnecki, M. M. ..... St. Paul
Satersmoen, Theodore ..... Pelican Rapids
Sather, E. R. ..... Alexandria
Satterlee, H. W. ..... Lewiston
Satterlund, V. L. ..... St. Paul
Saunders, T. S., Jr. ..... Rochester
Savage, F. J. ..... St. Paul
Sawatzky, W. A. ..... Minneapolis
Schaaf, F. H. K. ..... Minneapolis
Schaefer, J. F. ..... Owatonna
Schaefer, S. ..... Winona
Schaefer, W. G. ..... Minneapolis
Schatz, F. J. ..... St. Cloud
Scheldrup, N. H. ..... Minneapolis
Scherer, C. A. ..... Duluth
Scherer, L. R. ..... Minneapolis
Scherer, R. G. ..... Dubuque, Iowa
Schimelpfenig, G. T. ..... Chaska
Schlesselman, George ..... Anoka
Schlesselman, J. T. ..... Mankato
Schmidt, H. W. ..... Rochester
Schmidt, P. A. ..... Good Thunder
Schmidt, P. G. ..... Cottonwood
Schmidt, W. R. ..... Glencoe
Schmitt, A. F. ..... Minneapolis
Schmitt, S. C. ..... Minneapolis
Schneider, J. P. ..... Minneapolis
Schneider, P. J. ..... Adams
Schoch, R. B. J. ..... St. Paul
Scholpp, O. W. ..... Hutchinson
Schons, Edward ..... St. Paul
Schottler, G. J. ..... Dexter
Schottler, M. E. ..... Minneapolis
Schroder, C. H. ..... Duluth
Schuldt, F. C. ..... St. Paul
Schulhof, M. G. ..... Rochester
Schultz, J. A. ..... Albert Lea
Schultz, P. J. ..... Minneapolis
Schulze, A. G. ..... St. Paul
Schussler, O. F. ..... Minneapolis
Schutz, E. S. ..... Mountain Lake
Schwartz, V. J. ..... Minneapolis
Schwyzer, Arnold ..... St. Paul
Schwyzer, Gustav ..... Minneapolis
Scofield, C. L. ..... Benson
Scott, E. E. ..... St. Paul
Scott, F. H. ..... Minneapolis
Scott, H. G. ..... Minneapolis
Searles, P. W. ..... Rochester
Seashore, Gilbert ..... Minneapolis
Seashore, R. T. ..... Duluth
Secord, E. W. ..... Rochester
Seeley, I. F. ..... Northfield
Seham, Max ..... Minneapolis
Seifert, M. H. ..... Excelsior
Seifert, O. J. ..... New Ulm
Selleseth, I. F. ..... Minneapolis

Senkler, G. E. ..... St. Paul
Senn, E. W. ..... Owatonna
Serkland, J. C. ..... Rothsay
Setzer, H. J. ..... St. Paul
Shaleen, A. W. ..... Hallock
Shannon, S. S. ..... Crosby
Shapiro, E. Z. ..... Duluth
Shapiro, M. J. ..... Minneapolis
Shastid, T. H. ..... Duluth
Shaw, A. W. ..... Buhl
Shedlov, Abraham ..... Fosston
Sheedy, C. L. ..... Austin
Sheldon, W. D. ..... Rochester
Shellman, J. L. ..... St. Paul
Shelver, H. J. ..... Ortonville
Sheppard, Fred ..... Hutchinson
Sheppard, P. E. ..... Hutchinson
Sherman, C. L. ..... Luverne
Sherman, H. T. ..... Plainview
Sherman, R. V. ..... Thief River Falls
Sherwood, G. E. ..... Kimball
Shillington, M. A. ..... St. Paul
Shimonek, S. W. ..... St. Paul
Shoemaker, Rosemary ..... Rochester
Short, Jacob ..... St. Paul
Shrader, J. S. ..... Jordan
Siegmann, W. C. ..... Minneapolis
Silver, J. D. ..... Minneapolis
Simison, C. W. ..... Hawley
Simons, B. H. ..... Chaska
Simons, E. J. ..... Ah-Gwah-Ching
Simons, J. B. ..... Swanville
Simons, J. H. ..... Minneapolis
Simonton, K. M. ..... Rochester
Simpson, E. D. ..... Minneapolis
Sinamark, Andrew ..... Hibbing
Singer, B. J. ..... St. Paul
Siperstein, D. M. ..... Minneapolis
Sisler, C. E. ..... Grand Rapids
Sivertsen, Ivar ..... Minneapolis
Skinner, H. O. ..... St. Paul
Skjold, A. C. ..... Minneapolis
Slater, S. A. ..... Worthington
Sloan, Julius ..... Minneapolis
Sloan, L. N. ..... Minneapolis
Slocumb, C. H. ..... Rochester
Slocumb, J. A. ..... Plainview
Slyfield, F. F. ..... Duluth
Smersh, J. F. ..... Owatonna
Smisek, E. A. ..... St. Paul
Smisek, F. M. ..... Minneapolis
Smith, A. E. ..... Minneapolis
Smith, A. M. ..... Minneapolis
Smith, A. M. ..... Thief River Falls
Smith, B. A. ..... Crosby
Smith, B. F. ..... Rochester
Smith, C. M. ..... Duluth
Smith, F. D. ..... Kasson
Smith, F. L. ..... Rochester
Smith, H. L. ..... Rochester
Smith, H. R. ..... Minneapolis
Smith, L. G. ..... Montevideo
Smith, M. W. ..... Red Wing
Smith, N. D. ..... Rochester
Smith, N. M. ..... Minneapolis
Smith, W. R. ..... Grand Marais
Snell, A. M. ..... Rochester
Snyder, G. W. ..... St. Paul
Soderlind, R. T. ..... Minneapolis
Soderstrom, Edwin ..... Rochester
Sogge, L. L. ..... Windom
Sohlberg, O. I. ..... St. Paul
Sohmer, A. E. ..... Mankato
Soine, T. S. ..... Barnesville
Solhaug, S. B. ..... Minneapolis
Solsem, F. N. ..... Sacred Heart
Sommer, A. W. ..... Elmore
Sonnesyn, N. N. ..... Le Sueur
Sorenson, E. M. ..... Thief River Falls
Souster, B. B. ..... St. Paul
Sowers, B. F. ..... Rochester
Spano, J. P. ..... Minneapolis
Sperling, Louis ..... Minneapolis
Spicer, F. W. ..... Duluth
Sprafka, J. M. ..... St. Paul
Spratt, C. N. ..... Minneapolis
Spurbeck, R. G. ..... Cloquet
Spurzem, Clementine H. ..... Ah-Gwah-Ching
Spurzem, R. J. ..... Anoka
Stafne, W. A. ..... Moorhead
Stalker, L. K. ..... Rochester
Stangl, Fred ..... St. Cloud
Stangl, P. E. ..... St. Cloud
Stanley, C. R. ..... Worthington
Steenrod, E. J. ..... Rochester
Steffens, L. A. ..... Red Wing
Steffens, L. F. ..... Hibbing
Stein, R. J. ..... Pierz
Steinberg, C. L. ..... St. Paul
Steiner, I. W. ..... Winona
Stelter, L. A. ..... Minneapolis
Stenstrom, Annette ..... Minneapolis
Stephan, E. L. ..... Hinckley
Sterner, E. G. ..... St. Paul
Steube, R. W. ..... Alexandria
Stevens, F. A. ..... Lake Elmo
Stevens, John ..... Gonvik
Stevenson, B. M. ..... Fulda
Stewart, A. B. ..... Owatonna
Stewart, Alexander ..... St. Paul
Stewart, C. A. ..... Minneapolis
Stewart, Gwendolyn ..... Faribault
Stewart, R. I. ..... Minneapolis
Stickney, J. M. ..... Rochester
Stillwell, W. C. ..... Mankato
Stinnette, S. E. ..... St. Paul
Stocking, F. F. ..... Hallock
Stoeckmann, A. E. ..... St. Paul
Stomel, Joseph ..... Minneapolis
Stolpestad, A. H. ..... St. Paul
Strachauer, A. C. ..... Minneapolis
Strand, E. V. ..... Bayport
Strate, G. E. ..... St. Paul
Strathern, F. P. ..... St. Peter
Strathern, M. L. ..... Gilbert
Stratte, A. K. ..... Pine City
Stratte, H. C. ..... Windom
Strobel, W. G. ..... Duluth
Strohl, E. L. ..... Rochester
Strout, E. S. ..... Minneapolis
Strout, G. E. ..... Minneapolis
Stuart, A. B. ..... Cloquet
Stuhler, L. G. ..... Rochester
Stuhr, J. W. ..... Stillwater
Sturre, J. R. ..... Minneapolis
Stuurmanns, S. H. ..... Erskine
Sukeforth, L. A. ..... Duluth
Sullivan, R. M. ..... Minneapolis
Sullivan, R. R. ..... Rochester
Sundt, Mathias ..... Minneapolis
Sutherland, C. G. ..... Rochester
Sutherland, H. N. ..... Ely
Sutton, C. S. ..... St. Cloud
Sutton, H. R. ..... Hoffman
Swanson, Cephas ..... Minneapolis
Swanson, E. O. ..... St. Paul
Swanson, J. A. ..... St. Paul
Swanson, P. E. ..... Virginia
Swanson, R. E. ..... Minneapolis
Swedenburg, A. W. ..... Thief River Falls
Swedenburg, P. A. ..... Pawnee, Nebr.
Sweetser, H. B., Jr. ..... Minneapolis
Sweetser, H. B., Sr. ..... Minneapolis
Sweetser, T. H. ..... Minneapolis
Sweitzer, S. E. ..... Minneapolis
Swendseen, C. G. ..... Minneapolis
Swendson, J. J. ..... St. Paul
Swensen, R. G. ..... Harris
Swenson, A. O. ..... Duluth
Swenson, O. J. ..... Waseca
Swezey, B. F. ..... Buffalo
Sybilrud, H. W. ..... Bricelyn

Tangen, G. M. ..... Canby
Tanglin, W. G. L. ..... Mahnomen
Tanquist, E. J. ..... Alexandria
Taylor, C. W. ..... Duluth
Teem, M. Van B. ..... Rochester
Teisberg, C. B. ..... St. Paul
Telford, V. J. ..... Litchfield
Ternstrom, O. H. ..... Minneapolis
Thabes, J. A., Jr. ..... Brainerd
Thabes, J. A., Sr. ..... Brainerd
Thayer, E. A. ..... Truman
Thiessen, N. W. ..... Rochester
Thomas, G. E. ..... Minneapolis
Thomas, G. H. ..... Minneapolis
Thomas, G. J. ..... Minneapolis
Thompson, Albert ..... St. James
Thompson, Arthur ..... Cokato
Thompson, F. A. ..... St. Paul
Thompson, G. J. ..... Rochester
Thomson, J. M. ..... Brownsdale
Thordarson, Theodore ..... Minneota
Thoreson, M. O. ..... St. Paul
Thorson, E. O. ..... Luverne
Thorson, O. P. ..... Northfield
Thysell, F. A. ..... Moorhead
Thysell, V. D. ..... Hawley
Tibbetts, M. H. ..... Duluth
Tierney, C. M. ..... Harmony
Tifft, C. R. ..... St. Paul
Tilderquist, D. L. ..... Duluth
Tillisch, J. H. ..... Rochester
Tingdale, A. C. ..... Wayzata
Tinker, C. W. ..... Stewart
Tofte, Josephine ..... Dawson
Torgerson, W. B. ..... Oklee
Tovell, R. M. ..... Rochester
Traeger, C. A. ..... Faribault
Traxler, F. J. ..... Henderson
Tregilgas, H. R. ..... South St. Paul
Troost, H. B. ..... Mankato
Trueman, H. S. ..... Minneapolis
Truog, C. P. ..... Lindstrom
Trutna, T. J. ..... Silver Lake
Tryten, E. G. ..... Albert Lea
Tunstead, H. J. ..... Minneapolis
Tuohy, E. B. ..... Rochester
Tuohy, E. L. ..... Duluth
Turnacliff, D. D. ..... Minneapolis
Turnbull, Andrew ..... Rochester
Tweedy, G. J. ..... Winona
Tweedy, R. B. ..... Winona
Tyrrell, C. C. ..... Minneapolis

Ude, W. H. ..... Minneapolis
Ulrich, H. L. ..... Minneapolis
Undine, A. C. ..... Minneapolis
Urberg, S. E. ..... Duluth
Urner, J. A. ..... Minneapolis

Vaaler, T. ..... Cannon Falls
Vadheim, A. L. ..... Tyler
Vail, J. B. ..... Henning
Valentine, W. H. ..... Tracy
Van Meier, Henry ..... Stillwater
Van Slyke, C. A. ..... St. Paul
Vaughan, V. M. ..... Truman
Veirs, Dean ..... St. Paul
Veirs, Ruby S. ..... St. Paul
Venables, A. E. ..... St. Paul
Vercellini, C. E. ..... Duluth
Vezina, J. C. ..... Mapleton
Vik, Melvin ..... Onamia
Vinson, P. P. ..... Rochester
Virnig, M. P. ..... Wells
Vogel, H. A. L. ..... New Ulm
Vogel, J. H. ..... New Ulm
Von der Weyer, William ..... St. Paul
Voyer, E. O. ..... Minneapolis

Waas, C. W. ..... St. Paul
Wagener, H. P. ..... Rochester
Wahlberg, E. W. ..... Isle
Wahlquist, H. F. ..... Minneapolis
Wakefield, E. G. ..... Rochester
Waldron, C. W. ..... Minneapolis
Walker, A. E. ..... Duluth
Walker, A. E. ..... St. Paul
Walker, G. H. ..... Winona
Wall, C. R. ..... Minneapolis
Wallace, M. O. ..... Duluth
Waller, J. D. ..... Wilmont
Walter, C. W. ..... St. Paul
Walters, Waltman ..... Rochester
Wangensteen, O. H. ..... Minneapolis
Wanous, E. Z. ..... Minneapolis
Ward, A. W. ..... Minneapolis
Ward, C. E. ..... Rochester
Ward, P. A. ..... Minneapolis
Warham, T. T. ..... Minneapolis
Warnock, R. W. ..... St. Paul
Warren, E. L. ..... St. Paul
Warren, F. S. ..... Washington, D. C.
Watkins, C. H. ..... Rochester
Watson, A. M. ..... Royalton
Watson, J. A. ..... Minneapolis
Watson, N. M. ..... Red Lake Falls
Watson, P. T. ..... Cass Lake
Watson, W. J. ..... Holdingford
Watz, C. E. ..... St. Paul
Waugh, J. M. ..... Rochester
Webb, R. C. ..... Minneapolis
Webber, E. E. ..... Duluth
Weber, H. M. ..... Rochester
Weed, V. A. ..... Red Lake Falls
Weir, J. F. ..... Rochester
Weiser, G. B. ..... New Ulm
Weisman, S. A. ..... Minneapolis
Welch, C. S. ..... Rochester
Welch, M. C. ..... St. Paul
Wellbrock, W. L. A. ..... Rochester
Wells, W. B. ..... Sherburn
Welsh, A. L. ..... Rochester
Wenner, W. T. ..... St. Cloud
Wentworth, A. J. ..... Mankato
Werner, O. S. ..... Cambridge
Wesson, H. R. ..... Rochester
West, E. J. ..... Duluth
Westby, Magnus ..... Madison
Westby, Nels ..... Madison
Westerman, A. E. ..... Montgomery
Westerman, F. C. ..... Montgomery
Westman, R. T. ..... Minneapolis
Wethall, A. G. ..... Minneapolis
Wetherby, Macnider ..... Minneapolis
Weum, T. W. ..... Minneapolis
Wheeler, D. W. ..... Duluth
Wheeler, M. W. ..... St. Paul
Whitacre, J. C. ..... St. Paul
White, A. A. ..... Minneapolis

White, S. M. ..... Minneapolis
White, W. D. ..... Minneapolis
Whitesell, L. A. ..... Minneapolis
Whitmore, Frank ..... St. Paul
Whitson, S. A. ..... Alden
Whittaker, L. D. ..... Rochester
Widen, W. F. ..... Minneapolis
Wiese, H. F. B. ..... Minneapolis
Wilbur, D. L. ..... Rochester
Wilcox, A. E. ..... Minneapolis
Wilder, R. L. ..... Minneapolis
Wilder, R. M. ..... Rochester
Wilken, P. A. ..... Minneapolis
Wilkinson, Stella L. ..... Duluth
Wilkowske, R. J. ..... Nerstrand
Will, W. W. ..... Bertha
Willcutt, C. E. ..... Minneapolis
Williams, A. B. ..... St. Paul
Williams, C. A. ..... Pipestone
Williams, C. K. ..... St. Paul
Williams, H. O. ..... Lake Crystal
Williams, L. A. ..... Slayton
Williams, M. R. ..... Cannon Falls
Williams, Robert ..... Minneapolis
Williams, R. V. ..... Rushford
Williamson, G. A. ..... St. Paul
Willius, F. A. ..... Rochester
Wilmot, H. E. ..... Litchfield
Wilson, C. E. ..... Blue Earth
Wilson, J. A. ..... St. Paul
Wilson, J. V. ..... St. Paul
Wilson, L. B. ..... Rochester
Wilson, R. H. ..... Winona
Wilson, V. A. ..... Ah-Gwah-Ching
Wilson, Warren ..... Northfield
Wilson, W. E. ..... Northfield
Wilson, W. F. ..... Lake City
Wiltrout, I. G. ..... Oslo
Winer, L. H. ..... Minneapolis
Wingquist, C. G. ..... Carlton
Winnick, J. B. ..... St. Paul
Winter, J. A. ..... Duluth
Winther, Nora M. C. ..... Minneapolis
Witham, C. A. ..... Minneapolis
Withrow, M. E. ..... International Falls
Wittich, F. W. ..... Minneapolis
Wohlrabe, A. A. ..... Minneapolis
Wohlrabe, C. F. ..... Minneapolis
Wohlrabe, E. J. ..... Springfield
Wold, K. C. ..... St. Paul
Wolfe, H. H. ..... St. Paul
Wolff, H. J. ..... St. Paul
Wolff, L. H. ..... Rochester
Wolner, O. H. ..... St. Peter
Woltman, H. W. ..... Rochester
Wood, H. G. ..... Rochester
Woodruff, C. W. ..... Chatfield
Woodworth, Elizabeth ..... Minneapolis
Woodworth, L. F. ..... Le Center
Workman, H. M. ..... Tracy
Workman, W. G. ..... Tracy
Wray, W. E. ..... Campbell
Wright, C. B. ..... Minneapolis
Wright, C. D. ..... Minneapolis
Wright, C. O. ..... Luverne
Wright, F. R. ..... Minneapolis
Wunder, H. E. ..... Shakopee
Wyatt, O. S. ..... Minneapolis
Wylie, A. R. T. ..... Faribault
Wynne, H. M. N. ..... Minneapolis

Yaeger, W. W. ..... Ivanhoe
Ylvisaker, R. S. ..... Minneapolis
Yoerg, O. W. ..... Minneapolis
Young, T. O. ..... Duluth
Young, V. A. ..... Duluth
Younger, L. I. ..... Winona
Youngren, E. R. ..... St. Paul

Zachman, A. H. ..... Melrose
Zachman, L. L. ..... St. Paul
Zander, C. H. ..... St. Paul
Zaworski, E. A. ..... Minneapolis
Zeien, Thomas ..... North Branch
Zellhoefer, H. W. K. ..... Rochester
Zemke, E. E. ..... Fairmont
Zide, H. A. ..... Rochester
Zierold, A. A. ..... Minneapolis
Zimmermann, H. B. ..... St. Paul
Zintek, A. R. ..... Winona
Ziskin, Thomas ..... Minneapolis
Zlatovski, Michael ..... Duluth